THE JOURNAL OF GAS LIGHTING
WATER SUPPLY & SANITARY IMPROVEMENT

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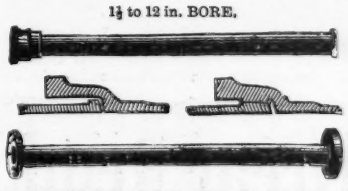

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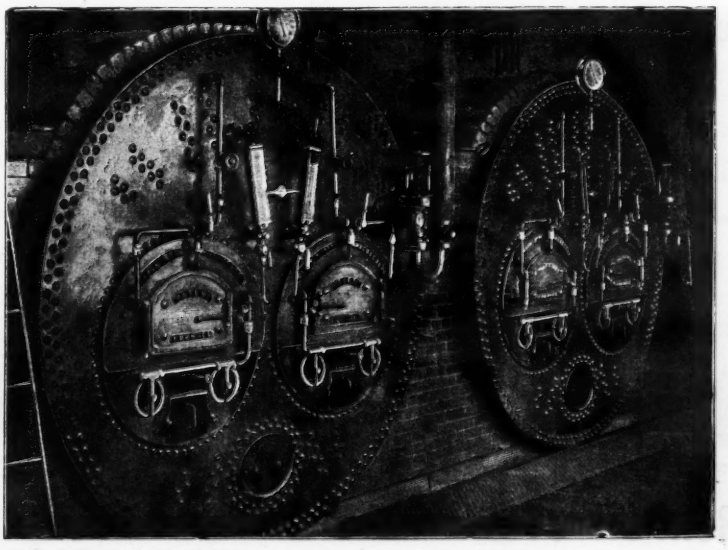

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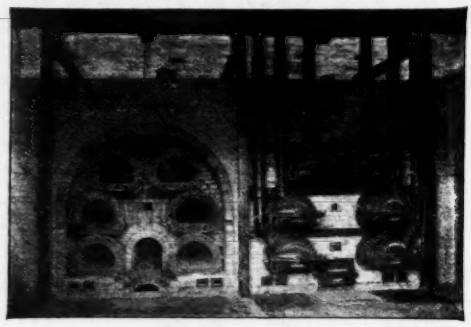

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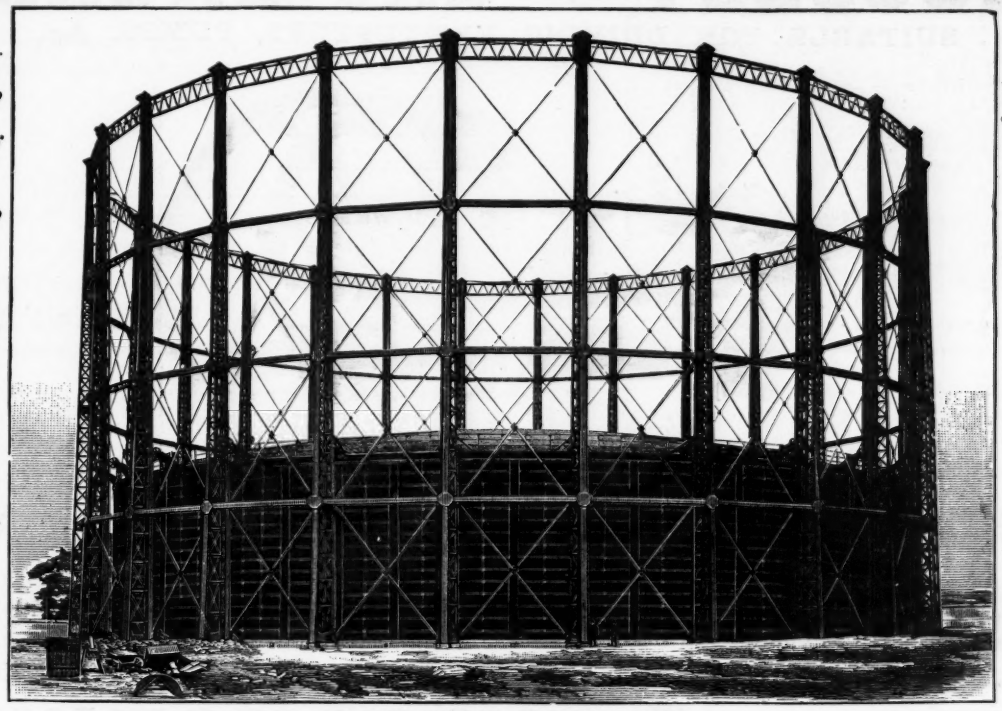

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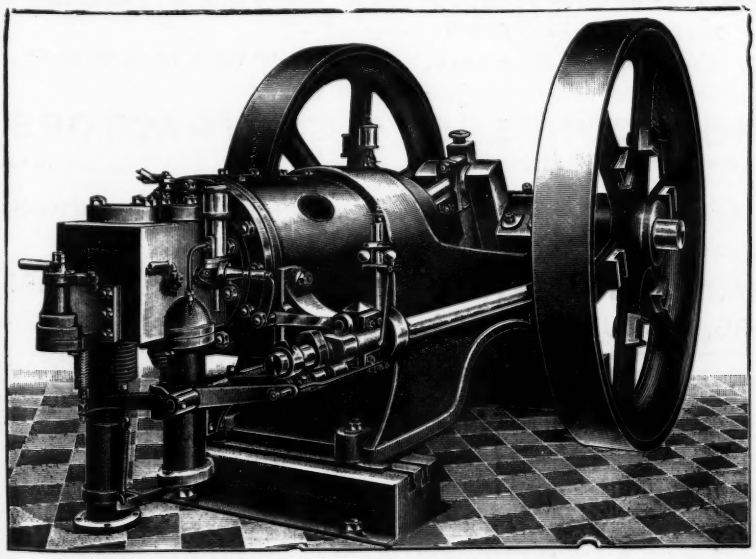

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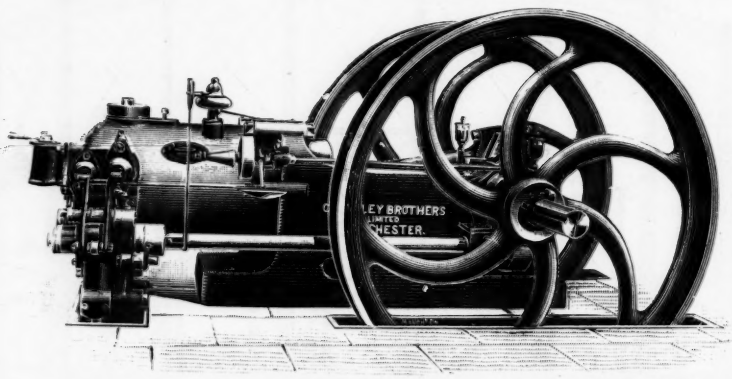

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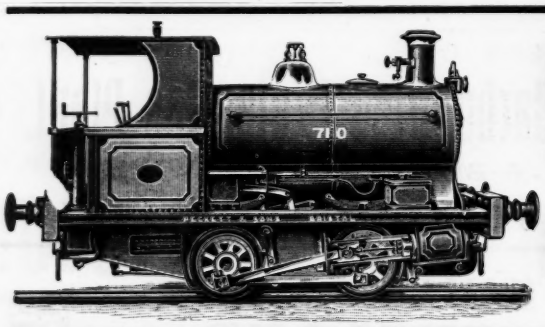

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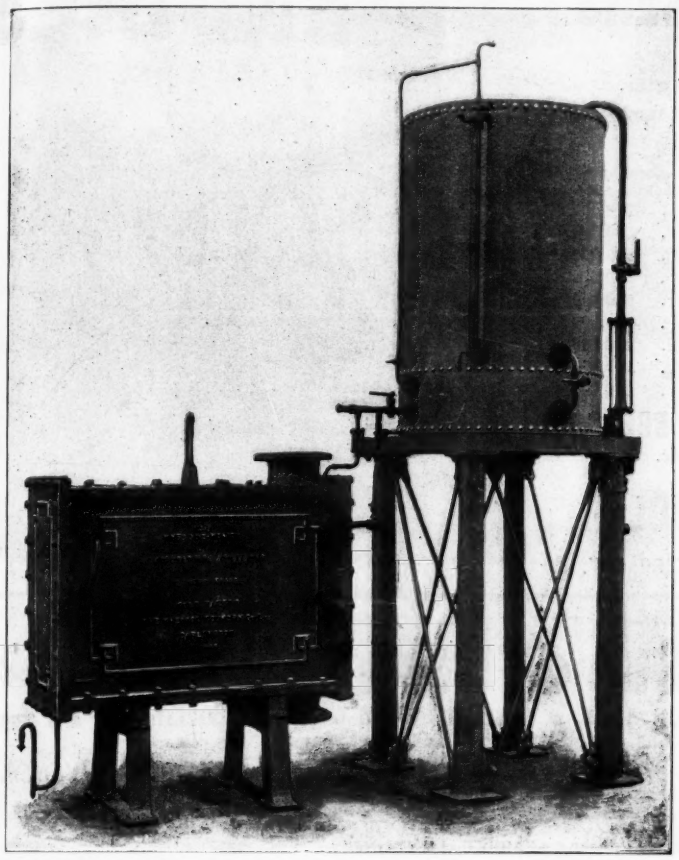

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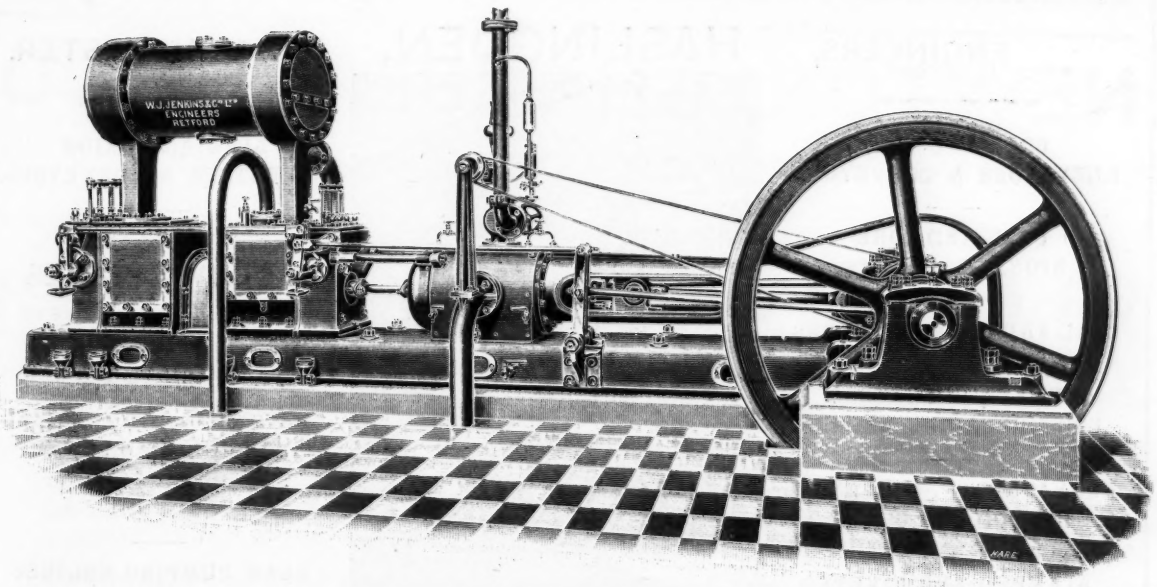

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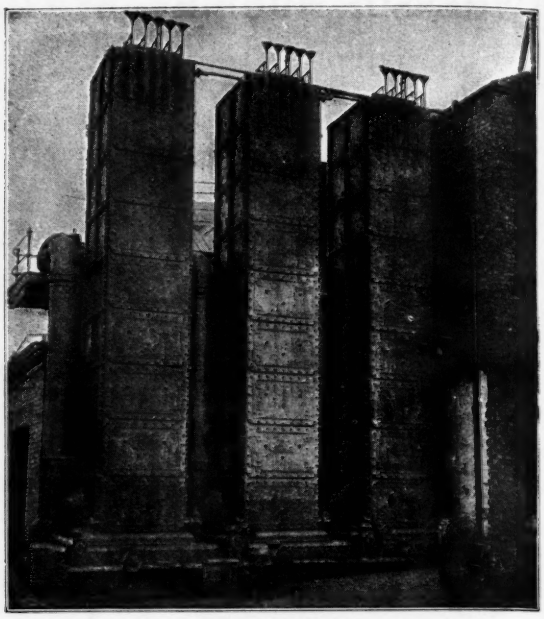

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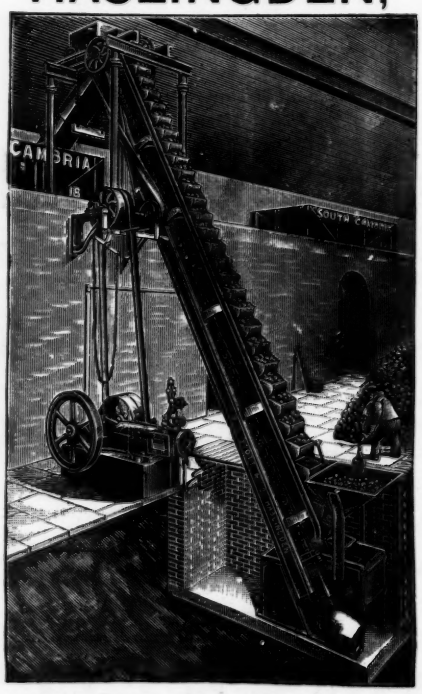

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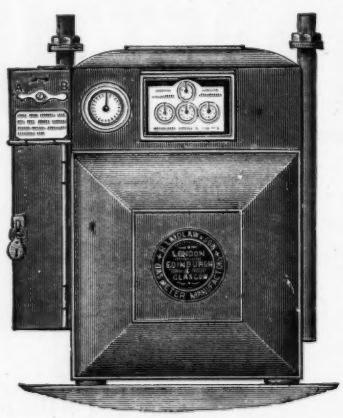

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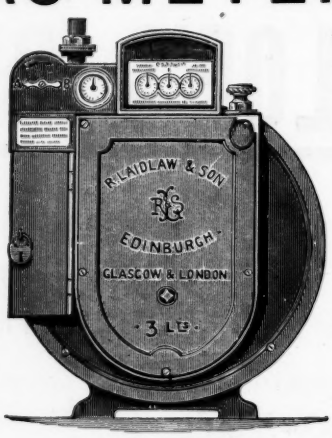

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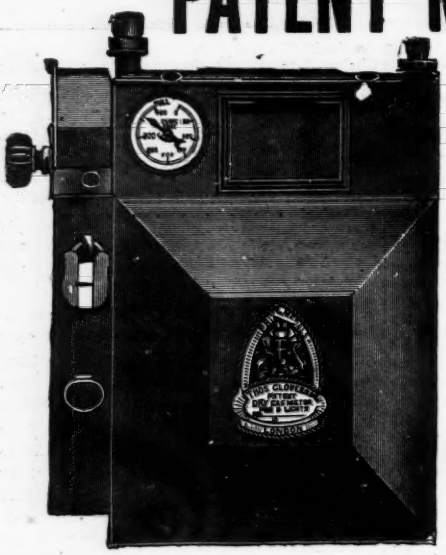

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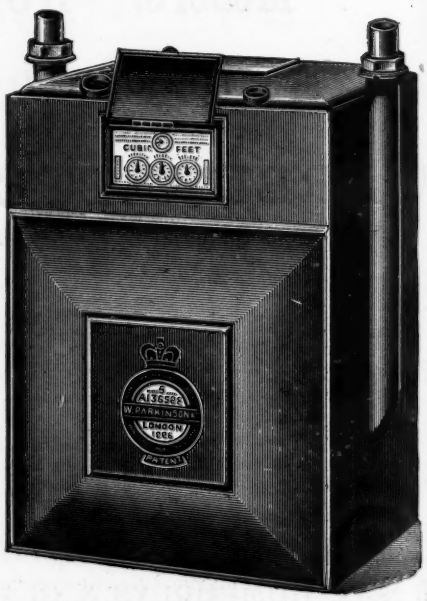

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EDITORIAL NOTES.

Affairs of the South Metropolitan Gas Company.

THE meeting of the South Metropolitan Gas Company on Wednesday, under the chairmanship of Sir George Livesey, was very fully attended by a particularly well-satisfied body of shareholders. The Chairman's speech was, as usual, lucid and convincing; and there is no small satisfaction in the reflection that, although gas company chairmen come and go, the collected speeches of Sir George Livesey to the South Metropolitan proprietary will always remain for the guidance and instruction of those who would know how a great gas undertaking should be administered. It is impossible to avoid the conviction that in these plain words we have the best available summary of the whole duty of the gas director. There is nothing quite like them, on the same scale. Here and there one meets with wisdom at the head of some comparatively small gas undertaking—company or municipal; but usually the public utterances of the official spokesman or apologist for a gas company or committee are amateurish, and strike the hearer as second-hand. It must necessarily be so under our national system; but the consequences are too often deplorable. It may, of course, be remarked that there is only one Livesey, and that by no conceivable mechanism of administration could another be produced when wanted. But this is not a fair statement of the case. If there were half-a-dozen working Liveseys in the profession of gas engineering, what would be the prospect of one of them finding himself in a similar place to that occupied by the South Metropolitan Chairman? Where is the inducement for any engineer to mould himself on this singular example of technical skill and adeptness in the management of affairs? If Sir George Livesey had his livelihood to gain, he could not afford to be Chairman of the South Metropolitan Gas Company—a position which, we believe, is only worth some £600 a year. The logical result of this unbusinesslike system is that a gas directorship is really little more than a sort of old age pension to respectable incapacity with a little money of its own. Such incumbents of office naturally stick to their seats on the Board so long as they possibly can; and it is not worth a good man's while to give the best of his time and care to the duties.

Gas-works administration is a labour of love to Sir George Livesey; but it is not so for another living man. Therefore, it is not fair to measure any other gas director or consulting engineer by his standard—and especially directors. When the long tale of Sir George Livesey's services to his country comes to be written out—may it be many years hence!—not the least will be his plan for improving the English joint-stock company system of administration by making the nominal also the real headship of the concern. Meanwhile, he is almost unconsciously putting together in his South Metropolitan speeches the true body of doctrine to serve for the guidance of his successors—and contemporaries too, if they will receive it. We must confess that we like Sir George best so. He is never so true to his own best lights as when he is laying down, out of the treasures of his unequalled experience and natural gifts, those simple counsels of prudence, enterprise, and condensed and focussed wisdom which carry their credentials with them. And there stands the South Metropolitan Company to witness to the soundness of the principles upon which the affairs of the undertaking—including the relations with the consumers and the employees—have been administered since Sir George Livesey became its head.

Whatever Sir George's reputation for profundity of technical knowledge, and for tenacity in driving his bargains to a desired issue through every obstacle, his manner in the South Metropolitan chair is candour and simplicity itself. Although "ever a fighter"—as we have classified him before, greatly to his own surprise—the South Metropolitan Chairman knows how to put by his weapons of offence when at home with his friends. The condition of the South Metropolitan Company is such as the man who is chiefly responsible for it may descant upon, so to speak, in friendly talk before the social hearth. There is nothing to complain of, nothing much to desire. It is highly gratifying, of course; but it is likewise a thought dull. There were some parts of Wednesday's proceedings that were almost somnolent in their calm. Was it the effect of the payment of the highest possible dividend—a line of conduct which has elsewhere secured Boards of Directors a long spell of presumptive popularity? Perhaps. But before laying too much stress upon this feature of the actual South Metropolitan position, it would only be fair to note what the Chairman had to say respecting the husbandry and self-denial that had gone to prepare for the present state of the Company's finances. Dividend is the subject of immediate interest to the shareholder; but capital is the most important and abiding care of the Directors. To always divide profits up to the last farthing, and pile up capital regardless of the future, may make things pleasant for the Board for a while; but there is a day of reckoning for this, and confusion for the end of it. Keep your capital expenditure rigidly down to new extensions, and look after your reserves the while; so shall your stock command a high value in the market, and when selling prices are low and the funds permit, you may divide as much as possible without risk of incurring blame or unpopularity. Such was the message of the South Metropolitan Chairman on the present occasion; and its homeliness should not obscure its high value.

After the Chairman, the weightiest speaker at the meeting was the Secretary, Mr. Frank Bush, with his quiet announcement that the Company possess a million pounds' worth of friendship in their gas-consuming shareholders. That was indeed a rich vein struck by the Board, when they decided to leave the Stock Exchange alone, and exploit their own claim. Look at it how one may, it is an amazing record; and the best of it is that it is on record, for others to profit by. To paraphrase a great utterance, the South Metropolitan Company have saved themselves by their exertions, and may yet save other gas companies by their example.

Two Requirements of Gas Directorates: Gas Experts and Adequate Pay.

MATTERS of considerable importance to the Crystal Palace District Gas Company and the consumers they serve were laid before the shareholders at their meeting last Friday. The Company have a Bill in Parliament this year which infolds what no other single Bill has done, and that is all that the fertile brain of Sir George Livesey has given to the gas industry during recent years, and has proved within his own particular province to be right, in connection with the art and manner of governing a large gas undertaking to meet present-day requirements, and the conditions which prevail. The Bill includes the reduction of the illuminating power of the gas, and the consequential diminution of the initial price under the sliding-scale; the alteration of the process of purification, so as to do away with the necessity of removing microscopic impurities, and so relieve the residents in the neighbourhood of the works of occasional present unavoidable nuisance; power to issue new stock to consumers and employees; and authority for the shareholding employees to elect one or more (but not exceeding three) of their number to be Directors. These with other minor matters clothe the Bill with unusual interest. Precedent and experience are not wanting in connection with any of them; but the measure brings to a focus the latest outbursts of the great initiative power of the Chairman of the Company, and seeks to apply them in their fulness for the first time to a Suburban Company. The course of the Bill and of the working of the powers it will (if carried through) confer, will be an interesting study.

A few people in the gas industry who are conscious of having shown less ingenuity and perspicacity than Sir George Livesey, have assured us that they are sick of

hearing and reading about him and his doings. No doubt, and for very good reason; but they are of a very small minority. It would be an evil thing for the gas industry if, in its present state of mutation, the man who now stands at the helm was not watching and his assistance not available. But the time will naturally come when it will be so, though it is anything but a pleasant thing to contemplate. Sir George Livesey, however, has no hesitation in talking about it himself; and he is not the least squeamish over what other people may say on the subject. Apart from the Bill, it was really the topic of most importance to engage the attention of the shareholders of the Crystal Palace Gas Company on Friday. If we may say so, it is rather appropriate that it should have happened at a meeting at which a Bill was under consideration which gives us a synopsis of the best of the author's new work during the last few years. Sir George will next April enter his seventieth year; and, looking to the future, he desires to make adequate financial provision for his successor, in order that the successor may be a man properly qualified and trained in gas administration and work in all branches, and so that the proprietors may be in a position, on the chair becoming vacant, to at once offer such a man such a reward that he will be willing to devote himself and his time freely to the work. To this end, the proprietors were asked by their Chairman to at once fix the Directors' fees at £2500, which is an increase of £1000; £1500 being the figure at which the fees have stood since 1876, although the business has increased fourfold. While, however, Sir George presides over the Company, only a part (he has given his word) of the increase will be divided. The remainder is distinctly for the purpose of providing an able gas man to succeed him in the chair.

But in dealing with this matter, the Chairman did not confine himself to its domestic side. His words constitute a message to the gas industry; and they declare his deliberate judgment on a large part of the present gas administration of this country, and his views as to what is required to remedy present failure, or, as he expresses it, "incompetence and ineptitude" in this regard. The part of his address to the proprietors in which he dealt with this matter will be found towards the end; and he again enlarged upon it in replying to the brief discussion. This is not the first time that he has delivered himself respecting the shortcomings in constitution and knowledge of the gas administrations of to-day, and pointed out the road to improvement; and his latest utterances show that as time passes, with its greater and greater accumulation of evidence, his views have become the more resolute. Here are a few sentences from what he said, and they may be taken as the essence of his argument in favour of the proposition that he submitted:

> The gas industry is suffering from the top to the bottom, all over the country, from the insufficiency of the reward that is offered to those who have to bear the brunt of the business. The engineers, managers, and directors are not paid enough to get the most capable men. There is no inducement for first-class men to enter the profession. . . . As to the chairmen and boards, there is no weaker spot in the gas administration of this country. It has been the rule to select men not for their qualifications, and not for their knowledge of the business, but for other reasons, with the result that the greatest incompetence and ineptitude are found in the direction of gas companies.

This is the deliberate judgment of the foremost gas administrator of the time; and the remedy resolves itself into one of reward to attract and obtain the services of the best men. Sir George is not here raising the cry of "Gas Boards for Gas Men." He would be the first to deprecate anything of the kind. But what he does say is that on the Board of a Gas Company there should be at least two trained gas men of proved ability, work, and worth; and the Chairman certainly should be one of them. He is emphatic on this latter point; and who better is capable of forming a view on the question of the necessary qualifications for headship than one who has filled the position of the chief officer of the second largest Gas Company in the country when there was not a gas expert on the Board, and has since been its Chairman? His specification for a suitable Chairman also provides that he should be a man not past the prime of life, a man of energy, and one who does not seek a multiplicity of directorships. This also applies to all directors. But to get such men, shareholders must be prepared to pay a proper fee. The Chairman is a firm believer in the old proverb, "Take Time by the forelock, for he is bald behind;" and hence his request to the proprietors to at once look to the future by making such provision that the Board may be, when the occasion arises (which we hope is far off), in a position to invite, with the promise of fair reward, the gas expert whom they may consider the most suitable to fill the chair. By passing the proposal put before them, the proprietors of the Crystal Palace Gas Company have declared their deliberate opinion that a sufficient reward should be paid in the gas industry to obtain the best men; and they have set a precedent which those companies who are unprepared and who are wise will follow. The prosperity of the industry and of every unit is in the hands of its administrators, and the responsibility of the appointment of those administrators rests, so far as Gas Companies are concerned, upon the shareholders.

The Danger of Pandering to the Shareholder.

THE fact that the vast majority of the shareholders in an industrial undertaking give little or no heed to its true financial position—by which, of course, we mean its position judged, not merely by the latest balance-sheet, but also in the light of an intelligent anticipation of the future (most investors being practically oblivious to aught beyond the current dividend)—is one of the most serious dangers attending joint-stock enterprise. This danger is aggravated by the circumstances that very many of the directors of such undertakings may be described as "the same, only "more so;" while most auditors are rather concerned to check the additions of figures, for the accuracy of which they depend upon the officials whose work they are appointed to examine, than to determine whether the assets of the company are (having regard not merely to cost but to present and future value) actually worth the figures attached to them in the balance-sheet. Were this not so, we should not have an expert in railway finance questions (Mr. C. H. Grinling) explaining to the students at Birmingham University that "to a certain extent British railway share-"holders are receiving reduced dividends at the present day "because too high distributions have been made in the past, "and by the amounts thus abstracted, *plus* compound in-"terest, the capital accounts have been unduly inflated." Nor, surely, should we have the Chairman of the Chartered Gas Company explaining that it is only now proposed (after a Parliamentary Committee has reported it to be advisable) to establish a scheme for wiping out—and that only in the next fifteen years—capital charges of a very large amount which became "obsolete," through the disappearance of the assets represented by such amount, close upon thirty years ago.

It seems to us that it should be made a very serious offence for any company to leave standing to the debit of its capital account any sum whatever in respect of which there remains in existence no living asset—by which we mean plant capable of being maintained out of revenue at a value, while in use, practically equal to its cost. If a works be closed and done away with because it is expedient or necessary to construct works elsewhere, or if machinery be "scrapped" to make way for new, the whole cost of the abolished works or machinery ought at once to be taken out of the capital account and transferred to a special "suspense" account, and, till liquidated, should be shown separately in the balance-sheet as "book value of non-"existent plant." The item would then be constantly staring shareholders, directors, and auditors straight in the face; and we do not believe that any company would allow (or would be permitted, if it wished, to allow) any substantial amount to remain unliquidated for any number of years if the figures were obtruded upon the notice of the auditors and of every reader of the balance-sheet, in the way we have suggested, instead of being completely concealed from attention, so far as the published accounts are concerned.

It is not, of course, in regard to works actually abolished that temptation most frequently presents itself to the dividend-loving representative of the dividend-craving shareholder; it is in regard to the maintenance of works and plant in the highest possible state of efficiency, or the introduction of modern costly machinery to replace antiquated but still useful—or rather, useable—plant, or (say) the substitution of more efficient rolling-stock for that which is still capable of running on its wheels, that the temptation comes to directors, as it comes to the municipal administrator, to "finance" for the present rather than for the future, and to ignore the fact that dividends unwisely paid away, just as reserves

wisely accumulated, are subject to the law of compound interest. A company which twenty-five years ago paid away £100,000 in dividends which it should have used to wipe out "obsolete" capital, or provide new machinery, is as surely £200,000 to the bad to-day, as it would be £200,000 to the good if it had invested a quarter of a century since £100,000 at 3 per cent. compound interest. Moreover, it is not merely that sum to the bad, but is also sure to have a less thoroughly developed business, and to be less able to contend against increased competition, or to adopt unforeseen changes in manufacturing processes, than had it made ample provision for "a "rainy day." The administrators of large industrial enterprises must realize (or, if necessary, must be compelled, by more efficient auditing, based upon more stringent legislalation, to recognize) that their duty is to consider, and adjust their policy to foster, the true interests of those undertakings as a whole, rather than the immediate benefit of the shareholders for the time being—in short, to save the business from its "friends." Perhaps, if directors' fees were proportioned, inversely, to the price of gas—say, fixed at *nil* with gas at 3d. below the statutory initial price, and then augmented by an annual sum in respect of every penny drop in the price from that point—their recipients might be more inclined to favour a cheap gas policy. But there, if gas directors cannot see the wisdom of such a policy without such a stimulant, they are really past praying for, and are dear at any price!

The Paris Gas Question Once More.

THE concession of 20 c. per cubic metre in the price of gas which, by a master-stroke of the Prefect of the Seine, the consumers in Paris have been enjoying since the beginning of the year, has not by any means settled the question of the gas supply of the city. It furnished a doubtless welcome solution of one part of the problem; but it left unsolved the larger portion, bearing upon the future control of this important business. The arrangement carried out with such remarkable alacrity by the Prefect did not touch, except in one particular, the terms of the Company's Treaty; and consequently they remain in operation for nearly another three years—strictly, till the end of 1905. In the meantime, some scheme has to be settled for carrying on the work after that date; and, in view of this fact, various groups of French and American financiers have lately been engaged formulating proposals for the acquisition of what is evidently regarded as a remarkably good business. In Paris, however, financiers propose, but the Prefect of the Seine disposes. All the projects, therefore, had to undergo the scrutiny of this keen-sighted and all-powerful official; and, as will be seen by an article appearing to-day in another part of the "JOURNAL," he selected five as worth attention, but recommends one—that submitted by the existing Company—for acceptance, subject to certain modifications, the chief of which apparently refers to the proposal to use carburetted water gas, in regard to which the Prefect has some mental reservation. Upon the whole, however, he considers this scheme the one which it will be most advisable for the City to adopt.

There are several features of the scheme which, it seems to us, justify the Prefect's recommendation. The term of the concession is shorter, by ten or fifteen years, than it is in the other cases; the consumers will be supplied at the existing price; the Municipality will not be deprived of a share in the concern, as payments ranging from 17¾ up to 23 million francs will be made to them annually; and they will become possessors of the works at the end of the concession. There has been a clamour for the municipalization of the supply; but, as the Prefect has not dealt with this subject in his report on the schemes, he evidently is not in favour of it. Whatever may be advisable in 1926, he does not think the Municipality should take up this business now. The relations between this body and the Company have not always been so pleasant as they might have been; but probably the conditions under which the atter have worked are to a large extent answerable for this. It is no reason, however, for rejecting unconsidered the new conditions they have now submitted, as a prominent member of the Municipal Council, who has closely studied the gas question, wished should be done. Indeed, their acceptance might bring about amicable relations to which both parties have for years been strangers.

At all events, the Company are now in possession, and, of course, have a thorough grasp of the business; and it would seem to be the wisest policy to leave it in their hands rather than entrust it to people who could not possibly enter upon it with the accumulated experience of those who now conduct it. The Company have of late years adopted what may be very appropriately called the "forward policy" in connection with the supply of gas; and there is no reason for supposing that they would abandon it under a new Treaty. On the contrary, we should be inclined to believe they would continue it on even more liberal lines. In any event, the consumers are thoroughly acquainted with the present business methods of the Company; and, all things considered, we do not think they have much cause for complaint. If the Company have clung to the high price which their Treaty allowed them to charge, the Municipality have kept an equally firm hold on the share of the profits which that document enabled them to claim. Between the two, the consumers have had to bear the burden of a charge for gas unexampled in any other important city in Europe. This, however, has now been lightened; and so the prolonged agitation which has taken place over this question has not been unproductive of benefit to the parties on whose behalf it was commenced.

Property of Highway Authorities in Public Roads.

A VERY valuable decision of the Court of Appeal has been delivered in what is already well known as the Finchley case, in which Mr. Justice Farwell held that the Urban District Council had a right to cut the wires of the local Electric Light Company where they crossed a public road. The real question involved in the action was as to the extent of the property in the road, which was an old turnpike road, vested in the District Council under the Public Health Act of 1875. The learned Judge held that the fee-simple of the road in question was vested absolutely in the Local Authority. The Electric Light Company would probably never have heard any objection raised to their wires crossing the road in a safe and proper manner, if the District Council had not themselves gone into the business of electric lighting. Thereupon, of course, in accordance with the usual spirit of fairplay actuating trading local authorities, the Council bethought them of their power as the highway authority to obstruct the Electric Light Company's business in this respect. Mr. Justice Farwell was with them on the point of law; but the Court of Appeal has now held his Lordship to have been wrong, on the ground that the only property a highway authority has in a public road is in respect to its use for the ordinary purposes of traffic. This is what has been generally understood to be the law of England on the subject. Sometimes it has been said that highway authorities have no other rights in roads than such as appertain to the skin of the surface used for traffic. They are always straining these rights to the uttermost, and trying to get a little more, especially when they are interested in the roads otherwise than as the old waywardens or turnpike trusts would have been. The judgment now placed upon record will therefore be a valuable check to these illegitimate pretensions. The Finchley Urban District Council did not want to cut the Electric Light Company's wire (which did not interfere with the wayfarers), out of any consideration for the safety of the traffic, but only as a means of hindering a rival in trade. They have now been taught a sharp lesson, being condemned in costs both of the appeal and in the Court below, and others will benefit by the warning.

Peace Practically Assured in South Wales.

COAL buyers generally will have learned with no little satisfaction—if they have studied the newspaper reports of the annual conference of the South Wales Miners' Federation held last week—that a peaceful settlement of the questions in dispute between the coalowners and their employees in the Welsh coalfields is now practically assured. That this is due mainly to the fact that the men have obtained far better terms than they anticipated, if not as good as those they asked for—better terms, indeed, than, in the opinion of a not inconsiderable minority of coalowners, a good many of the collieries can possibly afford to pay—is a matter that most people will trouble themselves but little about; though if it should prove that the owners have bought peace too

dearly, the struggle to readjust matters to a basis more satisfactory to them will undoubtedly be a more serious and costly one than would have taken place now if they had held out for, and not obtained, easier terms. The Joint Committee of representatives of the two sides came to an agreement, after the protracted negotiations which we have commented upon from time to time, under which wages are to be regulated by a Conciliation Board with an independent Chairman; the minimum and the maximum being fixed at 30 and 60 per cent. respectively above the standard of 1879—conditions similar to those already existing in the Federated districts of Great Britain. The question of the selling price, which is to be considered to justify a reduction of wages to the minimum, has been referred by agreement to an arbitrator; the "small coal" difficulty has been settled by the men withdrawing their claim; and the owners' demand for an increased price for coal supplied to the miners has been referred to a Sub-Committee of owners and men for their consideration. The only vital question left unsettled by the Joint Committee was that of the duration of the agreement which is to be drawn up; the owners making all their concessions subject to the conditions being settled for the next three years certain, while the men's representatives, bearing in mind the Southport resolution of the Miners' Federation—which provided for a movement in favour of a general improvement in wages conditions throughout the coalfields at the end of this year—would not assent to an agreement for three years without referring the matter to the general body of miners. At the conference of the South Wales Federation held yesterday week, however, only 19 out of 281 delegates voted against a contract for three years; so that, although Mr. Pickard's Federation have nominally the right to veto such an agreement—and would undoubtedly much like to do so—they are unlikely to exercise that veto in face of such a vote. Nor, if they did, is it likely that the South Wales colliers would throw away so satisfactory a substance to fight for a shadow simply to please Mr. Pickard, whose self-importance will be seriously offended at this flouting of his Federation. There is, therefore, every reason to anticipate a peaceful settlement of the trouble in South Wales, for the present at any rate; and for this coal consumers may well be thankful.

The Prospects of the Texas Oilfield.

From what has already transpired regarding the Texas oilfield, no great surprise will be felt at the announcement of the American Correspondent of the "Pall Mall Gazette," in the issue for the 12th inst., that, after a careful investigation of the subject, he is convinced that the supply of oil from what is known as the Texas district has not only been curtailed within the last few months, but that "there is good "reason to believe that the field will fail almost entirely within "the next year." Obviously, much depends, in the valuation of this report, upon the competence of the reporter and his good faith. Rather curiously, the news is not noticed in the current issue of the "Petroleum Review," which one would naturally think should have had something to say on the subject. The circumstance illustrates the difficulty, which we have had several occasions to mention, of procuring some trustworthy information as to the real condition of the petroleum trade at any time. It has been stated that the Standard Oil Company are largely interested in the Texas field, especially as regards the development of the trade in gas oil, chiefly for the home market. This statement appeared to be borne out by the gradual decrease in the yield of the older Pennsylvania fields, and the consequent need for finding supplementary sources of petroleum. Geologists and others have reported, in terms the sincerity of which should not be open to doubt, that there is a progressive falling off in the production of the old fields which yield the best lamp oils. This is not to be wondered at, seeing that these first-class fields are fifty years old, and nothing like their product has since been found in any part of the world. This contains a high proportion of kerosene—usually stated at about 75 per cent. of the total crude—whereas the best Russian oil only yields 33 per cent. of burning oil, and the worst not more than 20 per cent. All the newer fields that have been brought in—large or small, far or near—yield a comparatively heavy and dirty oil with little kerosene in it. In view of these facts, one should naturally expect the market price of the American staple to stiffen as time goes on; but this is not the case. Last week, for example, it was reported from New York that crude oil was cheaper.

To return, however, to the statements of the Washington Correspondent of the "Pall Mall Gazette." He declared, as regards the Texas field, that less than 25 per cent. of the wells which were flowing a year ago are now yielding oil in commercial quantities. The days of "gushers" have long passed, and every drop of oil at Spindle Top, which is the only district good for anything at all, has to be pumped. The wells are being drowned out with salt water, which cannot be separated from the oil. The district is therefore in face of ruin. Should the field become a failure, it will mean a total loss of millions sterling, spread over all sorts of interests. It is asserted that efforts have been made to conceal the true state of affairs, which began to look serious when six months ago a number of the wells showed salt water. These were immediately plugged, and excuses were made for abandoning them. By October, however, the trouble could no longer be hidden; and some of the largest companies are reported as declining orders. Meanwhile, several American promoters were in England "booming" Texas oil for all that fancy could paint it; and it is suspected that much English capital has in consequence gone into the field. This may be doubted, as the prevailing tendency here has been to let the Texans enjoy their good fortune. But if the report now in question is true, Texas oil must be ruled off as a resource of the British gas manufacturer.

Street Subways and Vibration Damages.

In connection with the appointment of the Royal Commission on London Traffic, we took the opportunity of commenting upon the folly of those amateurs of street subways who pretend that such constructions underneath the streets of old towns are the proper cure, not only for all the troubles in connection with main laying, but also for the inconveniences of heavy traffic. So far as pipe subways are concerned, there is never any difficulty raised by gas and water companies concerned in making use of them under proper conditions. The engineering questions arising out of these works of public convenience are, however, far more numerous and complex than the ingenious gentlemen suspect who make pretty sketches of shallow tunnels to go under ancient streets. It would be impossible to discuss such questions in a brief space, and we may be pardoned for making the suggestion that an exhaustive report on the subject would be very helpful indeed to the Royal Commission. The present Engineer to the London County Council is eminently qualified to prepare such a report. One only wonders, in glancing at such sketches of street subways as those referred to, whether the makers of them have ever thought about the property rights of the frontagers. There is the subject of vibration, to name only one infinitely troublesome matter. To hollow out a street unquestionably renders every neighbouring building shakier than it is when it stands upon solid ground and has solid ground all round it. When the Greathead tunnelling system was introduced, and deep tramway "tubes" became possible, it was fondly imagined that these perforations of the subsoil at a considerable depth might be made in any direction without reference to private property on the surface of the ground. This mistake was soon corrected; but it was succeeded by another—that where a deep tunnel was made in a tube under the line of a street, the frontagers would have nothing to complain of. The tube companies are learning to their cost that they must not injure other people's property. It is difficult to see how the shallow tramway subway idea can survive such a case as that of Dawson against the Great Northern and City Railway Company, in which a draper recovered £4150 damages to business premises caused by tunnelling operations. The Manchester Corporation are learning something about vibration in its legal aspect, in connection with their trade in electricity.

On West-End Public Lighting

The most exacting of the city councillors of Westminster cannot complain of a want of thoroughness on the part of their Chief Engineer (Mr. J. W. Bradley) in connection with his investigations into the matter of public lighting, which over the various parishes constituting the city has become concentrated in the new

authority under the changed order of things. It is a pity that the change did not come about earlier, and then perhaps, under the present authority and Mr. Bradley, the existing muddled condition of things in respect of street lighting would not have been created, and the ratepayers would have been saved—especially in the district of St. George's (Hanover Square)—a considerable expense. In the best interests of the city, work that has been done may eventually have to be done all over again. However, it will be remembered that in November last we published an article under the title of "Street Lamps under Test," in which were given the results of photometric tests of various kinds of public lamps that had been carried out by the testing branch of Mr. Bradley's department. Some reports as to costs which may be taken as supplementing the one referred to have now been forwarded by that gentleman; and these will be dealt with in another issue—preferring this week to publish some extracts from an highly informative report on the general lighting of the city which he has presented to the Lighting Sub-Committee of the Works, &c., Committee of the Council.

And Its Variety.

As already hinted, the present local authority of Westminster are not responsible for the great variety of the lighting, nor for the backwardness of some of the districts in the matter of raising the illumination of the streets to conform with modern ideas. But in this very variety, and in the details disclosed by Mr. Bradley, the report will be found of considerable value to gas and lighting authorities. The Council are committed to a heavy annual expenditure in the district of St. George's through that mad act of the old Vestry in tying the ratepayers up to a 30 years' contract for public lighting by electricity. The total cost for gas lighting in the parish in 1900, with flat-flame burners, was £9005, and at least three times the illumination could have been obtained, at the same annnal cost, by the simple process of converting the lamps to incandescent lighting. But the total cost per annum for electricity is now £21,914! St. Margaret's is lighted by incandescent gas-lamps at a far different cost; and St. Martin-in-the-Field, in its wisdom, has confined electric arc lighting to some of the main streets, and adopted incandescent gas lighting in the minor streets to a fairly considerable extent. The Strand district is in bad case, having, with only occasional breaks, clung tenaciously to the old flat-flame system. On the other hand, the district of St. James's possesses a goodly mixture—electric arcs, incandescent gas-lamps, and flat-flames. Mr. Bradley, in his report, does not attempt to indicate alterations and improvements; but, after learning the facts he presents as to the curious diversity of lighting that they have under their control, the Committee will surely desire him to pursue his investigations in this direction. With the exception of St. George's, the general conditions are favourable to the further consideration of the subject as the existing contracts run out or approach periods when they can be dealt with. If instructions are given to Mr. Bradley to continue his inquiries, there is one remark under "Experimental Lighting" in the report which is hopeful. "From my experience," he says, "of incandescent lighting, I do not hesitate to advise that in all cases where gas is used for street lighting, the incandescent system should be adopted." Gas, the report shows, is now used throughout very large districts over which the Council have jurisdiction.

The Testing of Low-Power Gas.

The quality of gas that can be obtained from the best available coal supply, without enrichment, is (high authority says) the gas of the future; and in London and many large areas of the country the best gas that can be produced from the most available coal supply is approximately of 14-candle power. Gas of that illuminating power has come to stay. London has led the way in breaking down the bias in favour of a higher illuminating power; and every new session of Parliament will without doubt—in view of the greater utility of the lower power and cheaper gas under the conditions of to-day—see fresh recessions from the higher candle power. But the learned phometrists and chemists, and even gas engineers, are yet seeking the point of agreement as to the correct method of testing the gas of the lower candle power, in order that justice may be done both to gas companies and the consumers. The evidence of the disagreement is found in the proceedings in the Parliamentary Committee rooms during the last two or three sessions, in Cantor lectures, in the pages of the "JOURNAL," and in the Bills introduced into Parliament this year. Everything that is said on the subject, and everything that is done, is disputed from one quarter or another. In the solution of this apparently difficult problem, Mr. Walter Grafton has evidently been quietly but largely exercising himself; and he has as a result, as the patent specifications published last week show, produced a modification in the "London" argand burner. The fact that he has patented the improvement, conclusively evinces his belief in it. For a description of the modified burner, and the patentee's prescriptions for its use in the testing of gas from (say) 17 candle down to 14 candle power, the reader must be referred to the abstract published on p. 412. The illustration represents the burner used for 14-candle gas. Mr. Grafton maintains that gas companies should have a burner that shows justly the reduction (in the case of a drop in the specified quality from 16 candles to 14 candles) of 2 candles and not nearly 3 candles, as, so we think he would contend, is the case with the South Metropolitan Gas Company's new method of testing—that is, burning a 16-candle flame in the present official burner. By the improved burner, the patentee finds that, with ordinary gas, he obtains "greatly increased candle power, with a diminished consumption of gas, by the better regulation of the air entering the burner necessary for the combustion of the gas—thus securing the highest luminosity." Mr. Grafton holds that his burner, burning gas to give a 14-candle flame, gives a higher (but right) result with a flame of lower power, and that this clearly shows that the 16-candle flame method does not truly do justice to the gas. The burner, being a modification of the "London" argand looks more acceptable than an entirely new one of different construction would be; for it will not alter any of the methods of calculation, and so other figures obtained under existing conditions can be compared with the results realized by this burner. This at all events will enable Mr. Grafton's burner to have a fair trial, and ensure that it will have full consideration by those who are most interested in this question of getting a test-burner that will give to gas of a lower power than 16 candles its just due.

The Incandescent Photometric Commission.

Following upon our recent remarks on the subject of the International Commission on the Photometry of Incandescent Light, we are able to-day to give the full list of the members of the Commission as finally constituted. It was only at the last Committee meeting of the Société Technique, held on the 9th inst., that the latest change in the representatives chosen was ratified. This was the substitution for M. Paul Audouin, of Paris, who has resigned, of M. Sainte-Claire Deville, the Engineer of the experimental works of the Paris Gas Company, and a well-known chemist. Of the eighteen members of the Commission, a Committee of six has been chosen. Their names are: M. Th. Vautier, of Lyons, who will always be remembered, among other things, as the President of the first International Gas Congress; M. Ph. Delahaye, of Paris, who will be the acting Secretary; Herr A. Weiss, of Zurich; Dr. H. Bunte, of Carlsruhe; Professor Vivian B. Lewes, as the English representative; and Dr. G. Love as the American one. The other twelve members are the following: Dr. Hugo Kruss (Hamburg), Herr W. von Oechelhaeuser (Dessau), Messrs. Charles Carpenter (London), James W. Helps (Croydon), and T. O. Paterson (Birkenhead), MM. P. Lauriol (Paris), Hubert Nachtsheim (Vienna), Th. Verstraeten (Brussels), Van Rossum du Chattel (Amsterdam), V. Krafft (Paris), Kohlrausch (Charlottenburg), and also M. Sainte-Claire Deville, already mentioned. This is a goodly collection of talent; and we wish them success in the pursuit of their labours.

A New Association in Ireland.

It will be seen by a report which appears in our "Technical Record" that a small coterie of gas managers in the South-East of Ireland have formed themselves into an Association for the purpose of holding meetings in towns within easy reach of each other, and talking over matters of general interest. The initiative in the matter was taken by Mr. J. G. Tooms, of Waterford, which city is to be the headquarters of the Association, and the place of meeting in the winter half year, the summer gatherings to be held elsewhere. Having mentioned Waterford, it is scarcely necessary to say that Mr. R. Bruce Anderson, who is Engineer

to the Gas Company, and is associated with various gas undertakings in the neighbourhood, is the first President, and that Mr. George Anderson is an honorary member. The majority of those who have joined the new body are also upon the roll of the Irish Association—Mr. Tooms being, in fact, the President; and we learn that they have no intention of seceding from it. It is not contemplated that the society will ever be a big one, or be in any way a counter-attraction to its parent; but it is thought that it will be able to do useful work in the direction of mutual improvement. At the same time, the meetings will not be merely conversational gatherings, as one of the rules gives the Secretary power to call upon a member to prepare a paper, and another requires each member to take part in the discussions. The complaint of Secretaries generally is that they have difficulty in getting papers for District Association meetings, and even the offer of a premium is not always effectual in producing one. It will, therefore, be interesting to see how the new plan works. It seems to us that it may have the effect of depriving the parent Association of contributions which would otherwise have formed part of its proceedings.

The Gaslight and Coke

In November last, we had occasion to notice briefly a series of articles published in the "Joint Stock Companies' Journal" in which the position of the Gaslight and Coke Company was exhaustively dealt with. The conclusion arrived at by our contemporary on that occasion was that it had said quite sufficient to show that the diminution of public confidence in the Company and its Directors was fully justified by the recent history of the business, especially when taken side by side with the results achieved over a term of years by four other Companies (which were not named, but which, it was stated, were chosen only with regard to their general fitness for the purpose for which they were required) operating within a few miles of the Gaslight and Coke Company's district. At that time, Gaslight and Coke ordinary stock was quoted several points higher than it is now; while in the interval striking proof has been forthcoming of the dissatisfaction of the shareholders generally with the administration of the concern. In the issue for the 11th inst., the "Joint Stock Companies' Journal" returns to the matter, with the remark that it has been compelled, after a close examination of the figures set forth in the half-yearly report of the Company, to admit once again that the great undertaking of the Horseferry Road is making "a poor struggle to return to something like its former glory." An analysis of the accounts of four other Companies (not the four referred to in the previous series of articles), leads our contemporary to remark: "We cannot offer to the proprietors of the Gaslight and Coke Company even that most dismal of all efforts to console—the assurance that others are in as bad a plight, or worse. Because the simple fact is that these other Companies have made substantial progress, what time the great institution with which we compare them has retrogressed sadly." On this occasion, the four Companies selected for purposes of comparison are named; they are the South Metropolitan, Commercial, Brentford, and Crystal Palace. A fairer choice could not possibly have been made; and it will be interesting to note in a few words what the figures prove. The object of the analysis, the compiler is careful to emphasize, was simply to bring out for inspection something like a fair standard with which to compare Metropolitan Gas Companies' reports as they appear; no comment is made on the achievements of any of the undertakings dealt with. The article concludes, however, as it began, with a very unkind remark regarding the performances of that "wonderfully feeble concern" the Gaslight and Coke Company. Those interested in the undertaking are asked to measure its strength by the standard supplied by the analysis of the other four Companies' accounts, when "the result cannot fail to be the feeling that in Horseferry Road there is need for a strong reform movement."

And Other Companies.

Let us now turn to the figures, upon which our contemporary has expended so much labour. First of all, the achievements of all the Companies named are recounted, in order that there may be a clear understanding of the extent to which they have individually contributed to the combined results which are later on set forth. We must, however, pass over this portion of the article, to the general experience indicated by the uniting of the accounts. In the last half of 1900, the total sales of gas effected by the four Companies were 7,893,685,000 cubic feet; and this was at a time when gas was comparatively dear, owing to the high price of coal. In the following year, the price of coal fell materially; and consequently the selling price of gas was on a lower level. In the latter half of that year, the output of the combined Companies was 8,398,865,000 cubic feet, or an increase of 6·4 per cent.; while for the last six months of 1902 a further increase of 2·3 per cent. is recorded, the sales having been 8,596,404,000 cubic feet. The total receipts of the Companies from all sources in the December half of 1900 were £1,591,971, of which £216,036 (or 13·6 per cent.) remained as net profit after the discharge of debenture and other claims. In the following year the income was £1,438,557, or a drop of 9·6 per cent.—the selling price of gas having been lower. But in spite of this falling off in the gross revenue, the net profits amounted to £253,385, or an increase of 3·4 per cent.—owing, of course, to the cheaper price at which coal was procurable. The record for last half year presents much the same features. The total combined income was £1,466,093, or 1·9 per cent. greater than in the corresponding period of 1901; while at the same time the net profits increased to £299,963, or 34·3 per cent. more than in the 1901 period. The proportion borne to the gross revenue by the net profit (which in 1900 was 13·6 per cent.) improved in 1901 to 15·5 per cent., and in the last half year to 20·4 per cent., which clearly shows the influence of manufacturing charges on the results achieved. To put the matter in a clearer light, our contemporary points out that every sovereign paid into the Companies' coffers between July 1 and Dec. 31, 1900, contained 32·64d. of clear profit; while in the next year, between the same dates, the profit was 37·2d.; and last year 48·96d. Then again, with a shrinkage of £125,878 in the revenue last year as compared with 1900—*i.e.*, nearly 8 per cent.—there was an increase of £83,927 in the realized profits, or an advance of 38·8 per cent. These, the writer remarks, are instructive figures, and convey with unmistakeable force the effect produced upon Companies of this class by the vagaries of the coal market, in particular during the last year or two.

Improved Means of Internal Communication.

A movement has been set on foot to obtain some improvement in the means of internal communication; the expense attending the existing methods being found to burden our industries heavily. It is desired to impress upon the Government the fact that the improvement of internal transport is a matter of urgent public importance, and that the placing of the canal system under public supervision is the best direction for immediate action. The matter is being strongly taken up by Chambers of Commerce and manufacturers in every part of the country; and they are being supported by the Council of the Society of Chemical Industry. As a preliminary step to the preparation of a case, the collection of accurate statistics, showing the incidence of freight upon several of the leading industries, is desirable; and the Council have therefore issued to the members a circular containing a few questions to which they invite answers. They cover the following points: (1) the nature of the goods manufactured; (2) the amount paid, directly or indirectly, for carriage within Great Britain of raw materials to the factory, expressed per ton of finished products; (3) the average amount paid per ton of these for carriage to the consumer, the retailer, or the port of shipment; (4) the average sale price per ton; and (5) the proportion carried by inland water-ways. Replies are to be sent to the General Secretary of the Society, Palace Chambers, Westminster, S.W.; and the figures will be treated as confidential—only summaries, without names, being published. One of the main points sought in these will be the percentage which the total freight charges bear to the selling price of the commodity. There is nothing here in the nature of undue inquisitiveness; and so the circular merits attention.

A Portable Photometer Proposal.

The portable photometer seems to be as far off as ever from justifying its existence—or, at all events, its inclusion among the gas-testing apparatus of local authorities whose duty it is to see

that the gas supplied to their districts is kept up to the statutory illuminating power. Last week an effort was made by a section of the Lighting Committee of the Guildford Town Council to introduce the instrument, at a cost of £45, and £3 3s. to the examiner for each evening's tests. But the majority of members preferred to spend the money of which they are to all intents and purposes the trustees, in some way more likely to benefit the persons from whose pockets it comes—that is, the general body of ratepayers. The wheelbarrow photometer has no *locus standi;* and whatever might be the results of tests made by it, no action could be taken upon them. Under certain conditions, the instrument might without doubt be made a capital medium for the "heckling" of the Gas Company; but how would ratepayers —*i.e.*, the purchasers of the photometer—benefit from this? In no way whatever. Discontent would be stirred up, and complaints be encouraged; while the Gas Company would take no steps to improve the quality of the gas supplied beyond the statutory illuminating power, but would treat the readings (taken at haphazard in various parts of the town) as they would deserve—that is, as utterly unreliable. The consumers of Guildford are entitled to gas of 15-candle power as tested at the works. This is what they pay for, and this is what they get. What then is the ground for all the pother? Why, it seems that the Company are actually supplying water gas enriched with substances which are heavier than the gas, "and in going through the pipes would be dropped on the way, just as mud was dropped in a river and dust in the air"—instead of confining themselves entirely to honest coal gas "which would remain as good to the last as when it left the works." This action of the Company has, it is hinted, made the use of incandescent burners indispensable in the street-lamps and elsewhere. Well, really! If this has been the result of the introduction of carburetted water gas, the consumers ought to be really thankful, seeing that they can obtain by means of the incandescent system an infinitely better light at a much less cost than would be possible with 15-candle ordinary coal gas and flat-flame burners. Are we to understand that the people of Guildford are so blind to their own interests that they cannot see the advantages of using incandescent gas-lights, and regard them as a necessary evil, instead as of a means for providing themselves with far and away the best (as well as, with gas at anything like a reasonable price, the cheapest) form of artificial lighting at present known to the world? It is easy to understand that the local Electric Light Company might regard Welsbach's invention with an unfriendly eye; but they are the only people in the town who have any good cause to do so.

Parliamentary Agents and Commissions to Town Clerks.

There has been a little correspondence during the past week regarding the short editorial article that appeared in our last issue on the subject primarily of the payment of commissions by Parliamentary Agents to the Clerks of Local Authorities; but only two of the letters are open for publication, and they appear today in our "Correspondence" column. It will be observed that in the editorial reference last week, care was taken to make it clear that the point as to the payment of commissions by Parliamentary Agents emanated entirely from Mr. Campbell Swinton, and was not made from any direct knowledge on our part. As to the other matters mentioned, we can vouch for their accuracy, though there again it is far from our intention—and that was also made abundantly clear—to "tar" all Parliamentary Agents "with the same brush." The first letter on the subject, which we publish elsewhere, deals with the accusation of Mr. Campbell Swinton (which, be it noted, was made publicly at the Society of Arts, at a meeting over which the Lord Chief Justice presided) that the "Association of Municipal Corporations was instituted by a firm of Parliamentary Agents, with a $33\frac{1}{3}$ per cent. commission to clerks who brought them business" in the way of promotion of, or opposition to, Private Bills. The letter is from Messrs. Sharpe, Parker, Pritchard, Barham, and Lawford, the third-named member of which firm is the highly-respected Secretary of the Association. No surprise was occasioned by the receipt of this letter, as we did not think a firm of the standing and reputation of this one would allow themselves to remain long under Mr. Campbell Swinton's imputation. But at the same time, the firm in their letter have not said a word about the general question of commissions; they merely content themselves with disproving the statement that the Association of Municipal Corporations was instituted by a firm of Parliamentary Agents, and, in fact, that they themselves had nothing to do with the organization until some six years after its formation. It must not be forgotten that, according to Mr. Campbell Swinton, this is not the first time he has made this charge as to the payment by Parliamentary Agents of commissions to the clerks of local authorities; and it is a pity that representatives of the accused profession have not before this made a public denial, or challenged Mr. Swinton for his proofs, and not allowed judgment to go by default. Our correspondent's letter does not by any means whitewash the whole of the Parliamentary Agents, though we should be very sorry if certain other firms whom we hold in high esteem should regard our animadversions as being directed to them.

Other Letters.

One private correspondent points out that "fees used to be divided years ago. The circumstances included an official letter in every case from the council approving the receipt of the contribution by the clerk." Surely our correspondent does not mean by this that there is no foundation whatsoever for the statement as to the existence in some quarters at the present day of the commission system; or that under no circumstances were Parliamentary Agents ever guilty of "dividing" fees without a letter of approbation by the council. Something not very complimentary to the councils might be said about these letters. The second letter in our "Correspondence" column supplements this private communication, and supplies the omission in that of the first correspondents. This letter also comes from Westminster, and the initials at the foot carry their own signification as to the professional vocation of the writer, and as to his knowledge of the inner workings of parliamentary agency at Westminster. He says: "You refer to the practice, *which no doubt prevails in certain cases, of parliamentary agents allowing commissions to clerks of local authorities* who bring them business." This looks like confirmation of the existence of the system, though far be it from us to say that it is general. We are able to assure Messrs. Sharpe, Parker, Pritchards, Barham, and Lawford, that the "other questions" alluded to in the article did not refer to them. But those questions are dealt with briefly in "P.A.'s" letter, and he rather defends those Parliamentary Agents who bleed those with whom they deal on behalf of clients wherever they have a chance. He can see nothing "immoral" in this insistence on discounts, which are not light ones in some cases—much heavier at all events than are justified by prompt payment. Nothing "immoral" in it! What of the Parliamentary Agent who expects to be able to produce to his client a "receipt in full" for his payment for printing work, without the discount—for which "P.A." pleads—being shown on the statement of account? Or what of the Parliamentary Agent who stipulates for advertisements he may insert being charged at full scale-rate on the account rendered, but a 50 per cent. allowance being made him on settlement? If there is nothing "immoral" about the receipt of such discounts, what is the objection to the receipt clearly showing the true facts of the payment? There is in these questions an indication of experience which "P.A." evidently lacks.

WATER AFFAIRS.

Our Diminishing Water Supplies.

THE discussion which was opened by Mr. W. Whitaker at the meeting of the Sanitary Institute last Wednesday, interesting as it was, did not furnish anything definite in the nature of a solution of the problem which the members had met to consider—namely, the prevailing shortness of water. It is useless to shut one's eyes to the fact that the sources of water in various parts of the country are less prolific than they were some years ago; and the question that is just now engaging the attention of thoughtful men, especially those who are responsible for keeping up a supply, is how this shrinkage can be checked, in order that the output may not have to be restricted in the future. The answer is difficult, because the causes of the trouble cannot be defined with absolute certainty. The increased pumping which is necessitated by the demands of an ever-growing

population, accustomed to a more liberal use of water than their forefathers, has been a potent factor in bringing about the present state of things, though it must not be made to bear an undue share of the responsibility. It is true that the evidence adduced from Hertfordshire and Kent strongly supported the case against pumping. When the yield of a spring such as the Chadwell is found to fall in the course of five-and-twenty-years from 3½ million to about a quarter of a million gallons per day, and for the first time in its history ceases to flow, it is not unreasonable to attribute this to the pumping going on in the neighbourhood. On the other side of the water, the Cray is being steadily depleted—whether from this or from some other cause it is not for us to say. In the North, in Yorkshire, improved drainage of the land has done much to carry away to waste water which would otherwise have gone to the replenishment of subterranean reservoirs. Finally, there has unquestionably been a deficiency in the rainfall.

Is there any remedy for the existing condition of things, and in what direction must it be sought? These were the points to which the speakers addressed themselves. In view of the great demand for water, it would be scarcely practicable to curtail the pumping. All that can be done is to husband the present resources by storing as much water as possible when it happens to be plentiful, and by stopping waste whenever this can be done. Mr. Whitaker attributed to the large storage possessed by the London Water Companies the freedom of the Metropolis from shortage of water when other places were suffering inconvenience. The provision of ample reservoirs, then, is one means of overcoming the difficulty attending a period of drought such as that through which we are now passing. It appears, from some statistics given by Dr. Mill, that since 1726 we have had alternate cycles of dry and wet years; and, judging from their average duration, we are approaching the end of one of the former. This is borne out by some valuable investigations by a German scientist (Dr. Brückner), who, going back to 1691, finds that the mean length of the wet cycles is 17½ years, and of the dry ones 18 years. This makes the period beginning with 1886 a dry cycle; and, according to his theory, it should end in 1905 or 1906, and be followed by a wet one till 1921. Whether or not this will actually occur is, of course, pure speculation. At present, as was pointed out in the "JOURNAL" a few weeks ago, we are fifteen months in arrear with our rain; so that we ought not to complain if Nature soon begins to pay up some of the arrears. Reference was then made to our "bountiful" Thames, as well as to the possibility of tapping sources of water beneath our feet. But one speaker cited figures to show that the flow of water over Teddington Weir is much less than was reckoned by Lord Balfour's Commission; and, according to Sir Alexander Binnie, who presided on Wednesday, we must not rely too confidently upon our underground stores, or expect much more water from the Lea Valley. As the present deficiency is attributed in some measure to the cutting down of trees, the recent suggestion of the Departmental Committee of the Board of Agriculture that afforestation should be carried out by corporations over their watershed areas, as this would contribute to the retention of the rain when it does fall, is one which, as we have already remarked, should have serious attention. Unfortunately, however, while the trees are growing the land is starving.

Association of German Makers of Fire-Resisting Materials.—The twenty-third ordinary general meeting of this Association took place in Berlin on Tuesday last, under the presidency of Herr Henneberg. Among the papers read were two dealing with the modern requirements of the metallurgical and chemical industries in regard to fire-brick and other refractory materials, and the influences which tend to lessen their durability. Several kindred Associations of German Manufacturers meet in Berlin this month, among which may be mentioned the Portland Cement Makers and the Concrete Association.

Midland Association of Gas Managers.—We have received from the Hon. Secretary of the Association (Mr. A. Cooke, of Oldbury) the programme for the annual meeting, which, as already announced, will be held at the Grand Hotel, Birmingham, on the 5th prox. As usual, the principal feature of the meeting will be the delivery of the Inaugural Address by the President (Mr. Charles Meiklejohn, of Rugby); the other items consisting of the routine matters which come before the members at their first gathering in the year. Among them, however, is a proposal to vote 25 guineas from the balance in the Treasurer's hands to the Benevolent Fund of the Institution of Gas Engineers.

ESSAYS AND REVIEWS.

THE POSITION OF THE INCANDESCENT TRADER.

THE writing of this title was a simple matter; but it is not so simple to define precisely what is to-day *the* position of the incandescent trader. It can only be stated broadly as one of uncertainty and of perplexity. What with combinations and rumours of combinations touching the whole range of their goods, they hardly know where they are. They certainly do not know what is going to happen next, what the future has in store for them, nor where the present position is going to finally land them. There is no doubt about this, that there is a movement towards an all-round raising of prices to the incandescent trader; and the fear is that the advances in cost will not remain at a moderate figure so as to inappreciably affect the retail prices. As more information leaks out, the present and near position of thorium appears to be, in view of the fact that the demand is daily increasing, a somewhat precarious one, as we will presently endeavour to explain, though it may be confidently said that the difficulty is only of a temporary nature. The combination in Germany which rules—and for the present can do so in a very effective manner as we have previously shown—the thorium market, have raised the price; but it is hoped that their exclusive power will not be of long duration.

Then it is still an indefinite matter whether or not the mantle makers of Germany are going to combine, and whether certain of the mantle makers of this country will, in the event of the German makers attaining to actual union, throw in their lot with them. The mantle makers of any importance in this country can be counted upon the fingers of one hand; but their output is large, and their influence great. On the one side, we are told that this projected combination is as good as off the *tapis;* but from another quarter comes the information that a conference is about to be held in this country. It is difficult from the conflicting statements to judge the truth. Disingenuousness appears to be a well-developed trait in some ranks of the incandescent trade; and a desire to make one aware that they are "in the know" leads to the pouring of many professedly true and semi-secret remarks into the journalist's ear. But the sources of news are not limited to this particular class; and there are informants in the trade, who, not liking combinations and preferring open competition, impart frankly all that they know which may be of use, however slight, in counteracting likely combinations, and so of service to buyers and users. Thus we know for a certainty that the proposal for the combination of mantle makers was a real thing; and, although the prospect of its present consummation is regarded in well-informed quarters as a little doubtful, the idea having taken root to an extent, there is no telling how soon—supposing it is at rest now—the scheme may be revived.

As we stated, too, last week, the hoary and hated head of combination has also raised itself among the glass-workers of Germany; and consequently up will go the price of glassware to the gas-fittings trader. Now to complete the gamut, the metal workers in Germany have also combined, in order to regulate their prices; and this very largely affects the burner trade. A considerable proportion of the incandescent burners—especially the cheaper lines—comes to this country from Germany. This combination is a result of the rise in the price of copper; and, in two steps, the price of rolled metal in Germany has gone up 10 per cent. Information from Birmingham, too, predicts an advance there. This is an artificially created rise in copper. There is no extraordinary demand for rolled metal at the present time, and the season for large wholesale dealing in burners has now come to an end for some months. As soon as the trade feels the effect of these combinations and risings, then the consumer and user will suffer—not so much the small householder as those users in whose interests we are first concerned, and they are the gas companies and town lighting authorities, who buy burners and mantles not singly but in the bulk. Even small increases, too, in the retail prices will not favour extended purchases among the poorer class of gas consumers.

Now of all questions affecting the incandescent market, perhaps the one of greatest importance is that of the position of thorium. We do not wish to appear as alarmists. There is no need for alarm; but there may be need for temporary caution. As readers are aware, the main source of thorium is monazite sand; and the price of monazite sand has made some remarkable flights. Some seven or eight years ago, we believe, it fetched about £50 a ton, and then, by 1901 it had fallen—notwithstanding the larger demand—to considerably under £20. This showed its plentifulness. After that it crept up in price until it reached £30. The Thorium Trust has raised it to £40, and shortly we may expect to see it at £50. The supply of thorium on the market is at present not abundant; and it looks as though it may for a period become more limited still. The source of supply of the monazite sand is, there seems to be little doubt, large; but the source, with its territorial limitations, is dominated by Governmental and concessionary rights. We do not know whether there is sufficient ground for the hope that the information published in the last-issued report of the Acting British Vice-Consul at Rio de Janeiro

means the crushing of the *quasi*-monopoly in thorium which the German combination has created. We trust it does. But the information may also mean that for the time the supply may be further shortened. The report states that "the concession which was granted by the Federal Government in 1901 to a German firm for exploring monazite sands on the foreshore in the State of Espirito Santo *has since been cancelled*, owing to non-observance by the concessionaires of certain clauses of the contract. It is understood that a fresh competition will be opened shortly. There are, however, still existing contracts made with the State Government of Espirito Santo for exploring these sands in State territory, but only on a limited scale." There is also a further hopeful sign that the sources of the sand in Brazil are extending; and this may also help to break through the restraint imposed by the present thorium combination, and widen the scope of the purchaser. In the report of the British Vice-Consul at Victoria (Espirito Santo) issued at the end of 1901, it was stated: "Important finds have been made of monazite sands, which will prove very valuable to this State as soon as the question of foreshore rights has been settled with the Federal Government." In the report issued last month, he further alludes to the subject, and says that "a concession has been granted by the State for the working of monazite sand in the State territory; a minimum quantity of 50 tons a month to be exported; duty to be paid £3 a ton." This duty bears a small relation to the existing and near prospective price of monazite sand.

The information given in the reports is not so transparent as one could wish; and there are few who know exactly what it really means. But it is clear that there is no shortage of the sand at the known sources. But the sand there is not here, and that is where there may be some passing difficulty. Some makers assert that they have thorium sufficient to last them long hence—far beyond such temporary trouble as there may be; but other makers disbelieve their boast. It would be interesting to know how many mantle makers would be prepared immediately to enter into contracts, with penalty clauses for non-fulfilment, for the supply of large quantities of mantles for delivery next winter. A few weeks, perhaps days, may bring a change, and prevent even transient pressure, but of that we cannot speak. It is rather a matter for congratulation that, if there is to be any temporary shortage in the supply of thorium, the days are lengthening. It is also encouraging to know that some of the large makers are continuing to prepare plant and accommodation for a largely increased output; and this they would not do if they had any fear. If pressure there be, the responsibility will, it is apparent, rest entirely with the German concessionaires and those who in that country have exercised a controlling power in this particular direction. It is to be sincerely hoped that the remarks quoted from the consular reports mean the breaking down of that power and the opening of the thorium market again to competition. We iterate that there is no occasion for alarm, but caution may be advisable in the case of considerable users.

In this question of the supply of the thorium and the effect on the price of mantles, is found the most important matter for the consideration of the trader, who, in this respect, lightly shifts any burden from his own shoulders on to those of the user. But the genuine trader in this country has other grievances; and with one of them we can heartily sympathize. It is in respect of the unfair competition to which he is subjected. It is not our intention to inflame old sores; but the point is so manifest to everybody, that no possible harm can be done in confessing that in one particular the licence system in connection with the dealing in mantles has been a failure. We have it from large traders that they are freely and openly offered unlicensed mantles at 2s. and 3s. less per gross than licensed manufacturers can afford to offer makes of equal quality at. Then another complaint is that, through the same cause, the retailer of licensed mantles has his business deplorably and unfairly cut into by the sales of those now ubiquitous shops which do big businesses in unlicensed importations at—being unlicensed—a lower price than the vendor of the licensed mantles can sell his goods at. It is true that some of these unlicensed mantles are worthless. But there are many mantles on the market that are not; and the public get to know of these, and then only concern themselves over the price they are asked to pay. Licences do not trouble them; and they naturally go to the shop where they can get the cheapest article.

Next to the exemption from litigation which the licence was to afford traders was the attraction of a guaranteed protection. Herein the licence has, it must be admitted, lamentably failed; and business in unlicensed mantles is openly and defiantly conducted as though no such thing as a licence existed. Now is this fair? Either the licence must be actively and firmly upheld, or it must fall, and the licensed traders be permitted to carry on their business with the freedom enjoyed by their unfettered competitors. Under the conditions prevailing to-day, those who honourably abide by their agreements do so at the expense of losing trade through the higher prices which perforce they are bound to charge in consequence of the payments made under the licence. This is a grievance with which we can sympathize; and the position is not by any means a happy one. It is said that one of the objects of the mantle makers' combination (so far as this country was concerned) was to squeeze out the type of competitor that we have been referring to, and to prevent the importation of rubbish. That was not the sole object; but it is a confession of the failure of the licence system that we did not expect to hear. With all respect, we submit that what the licence has not done, no combination of mantle makers could do, unless they also controlled absolutely the thorium market. But in these things loopholes and perfidy are always to be found; and the combination, we feel satisfied, would not have had the one effect referred to. And as to the complete control of the thorium market, we are hoping, in view of the consular reports, that monazite sand is going to get outside the present German ring. Why it was ever allowed to get into that ring is one of the things upon which our information is at present incomplete. It is hoped that those who hold the largest stake in the mantle market in this country have—if the "competition" of which the Acting Vice-Consul at Rio Janeiro speaks has already been held—done something to wipe out this irregularity and the subordination of the mantle business of this country to the German combination. Something could be written as to why the licence has proved ineffectual in suppressing violation of the agreement arrived at in the mantle trade with the Welsbach Company; but the reason is so obvious that the point need not be enlarged upon.

THE GAS AND WATER STOCK MARKET.

(For Stock and Share List, see p. 427.)

THERE were signs last week of an improvement in the general state of business on the Stock Exchange. It was a "Railway week"—attention being chiefly concentrated on rails of all sorts in all countries; and there was a marked advance in values pretty well all round but in the home market. Business might perhaps have been a little more extensive. But then it was settlement week, and the adjustment of the account demanded attention; and it was not effected without at least one small disaster. In the Money Market, there was a good, persistent demand for short loans; and the rates for discount were steady. Some people are almost clamouring for a reduction of the Bank of England rate. and are highly discontented at the maintenance of the 4 per cent. rate. Perhaps they will be better pleased on Thursday. In the Gas Market, business was on a fairly moderate scale; and the general tendency was in favour of steadiness without change. There were a few variations in quotation, apart from *ex div.* adjustments; and they were all in the upward direction. Attention was naturally directed to Gaslight and Coke issues in particular; and the ordinary was subjected to some sharp fluctuations. It opened weak, and fell a point; next day it fell another, changing hands more than once at 84. Then came a quick rebound on Wednesday, when one lost point was recovered, and the other was made good on Friday. The result was that the stock was bought *ex div.* on Saturday at a higher price than it had been *cum div.* on Monday. This is one of the results, unforeseen perhaps, of the proceedings at the general meeting; and some clever people who have put the profits in their pockets are thinking over the adage about fishing in troubled waters. South Metropolitan was quiet and firm at first, but was offered more freely with the dividend out of it on Thursday and Friday. A few dealings in Commercial showed a good tendency; and the 4 per cent. issue gained a point. In the Suburban and Provincial group, Brentfords were most conspicuous, and the new commanded good figures. But nothing changed. West Ham consolidated stock is now quoted in the list. The Continental Companies were very inactive, and were unchanged; Union showing no sign of recovery. Among the remoter undertakings, Buenos Ayres had a fractional advance. The Water Companies remain in the same inanimate condition, and only New River moved on *ex div.* adjustment. The next dividend will be the same as the last, within 0·004d. per cent. per annum!

The daily operations were: Gas was not very busy on Monday. Gaslight ordinary was weaker, and fell 1. Tuesday was similar; and that issue fell 1 more. Wednesday was more active and more buoyant. Gaslight ordinary and Commercial 4 per cent. rose 1 each, and Buenos Ayres ¼. Thursday was fairly active, and prices rose. Imperial debenture improved 1, and Malta ¼. Friday fell quieter; but Gaslight recovered 1 more. Saturday was quiet; but prices were very good, although quotations closed without further change.

The Secretary of the Institution of Gas Engineers (Mr. Walter T. Dunn) has issued the notice for the statutory general meeting, to be held on the 26th inst., at the Institution of Mechanical Engineers, Storey's Gate, S.W., to formally receive the report of the incorporation of the Institution. No other business will be transacted; but afterwards there will be an extraordinary general meeting of the contributors to the benevolent fund, to consider the revision of rules necessitated by the amalgamation of the two bodies now forming the Institution. The annual general meeting will be held in London in June; and the Council are desirous of being informed, as early as possible, of the intention of any member to prepare a paper to be read on that occasion, and of having particulars of the subject.

THE GRANTON WORKS OF THE EDINBURGH AND LEITH GAS COMMISSIONERS.

DESCRIPTION PREPARED

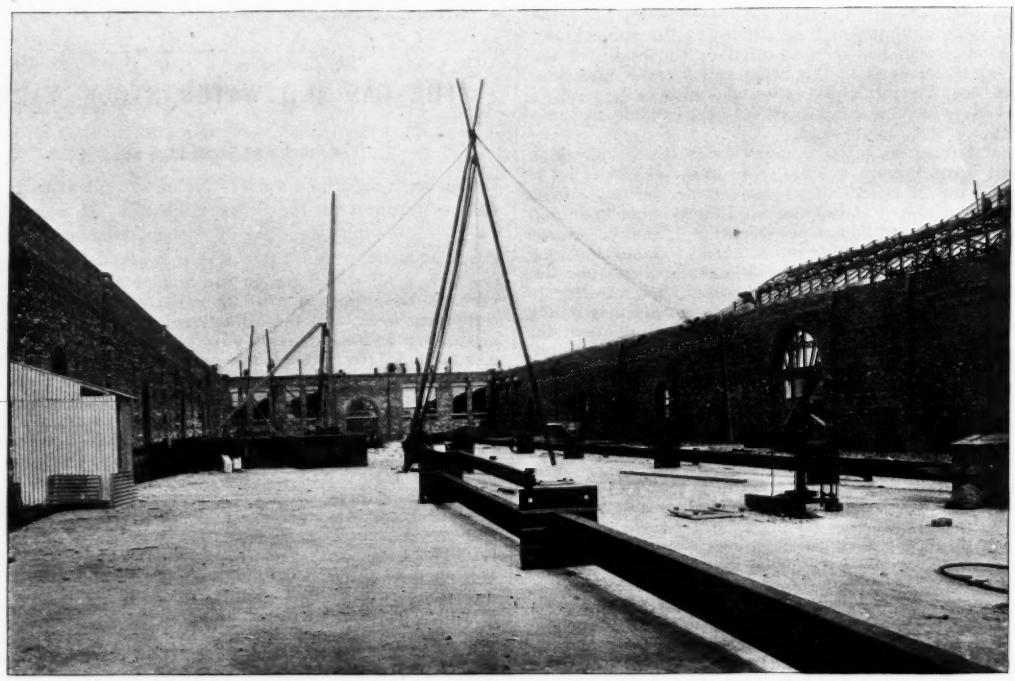
BY

WALTER RALPH HERRING, M.INST.C.E., *Engineer.* *

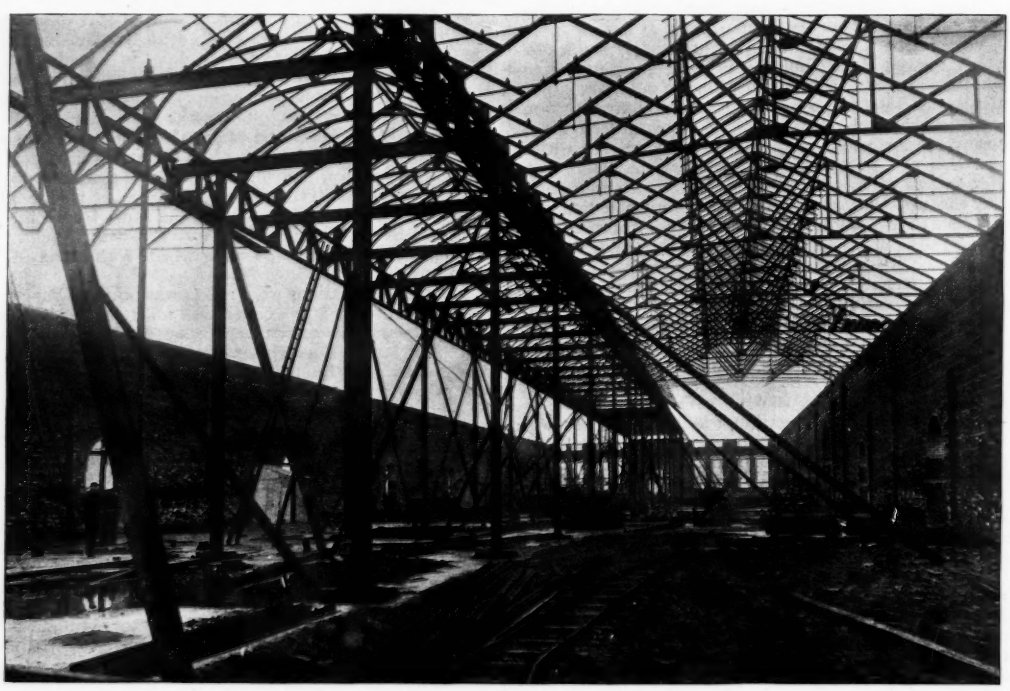
ARTICLE VII., accompanied by Plate No. 8, which shows the Roof, the Towers, and the Structural Steelwork in connection with the Coal-Store Block.

Plate No. 8 is made up from three sheets of contract drawings, and it illustrates the details of the structural steelwork and the roofs covering the coal-store block.

The buildings, which are about 500 ft. long by 93 ft. 3 in. over the side walls, are covered by a three-spanned trussed roof. As it was intended to fill the coal-store by means of automatic coal-handling plant, provision was made in the central span of the roof for carrying the appliances necessary for this purpose. This bay



PHOTOGRAPH No. 34.—Interior of the coal store. Standards shown for supporting the roof. (Sept. 27, 1900.)



PHOTOGRAPH No. 35.—Coal-store roof, with the structure in the central bay for carrying the coal-storing plant. (Nov. 28, 1900.)

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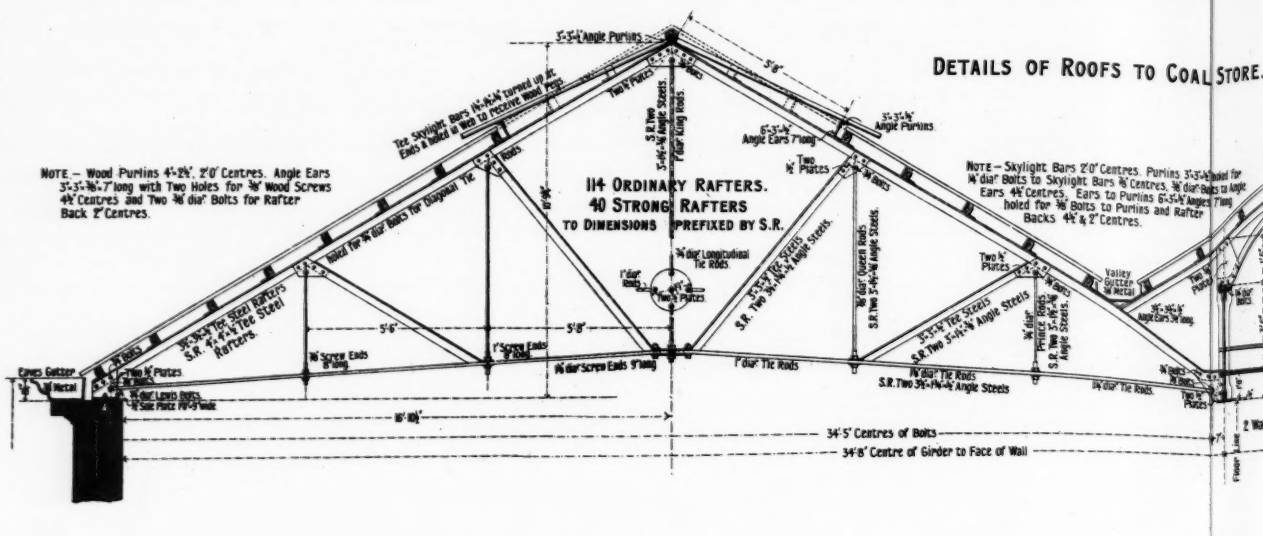
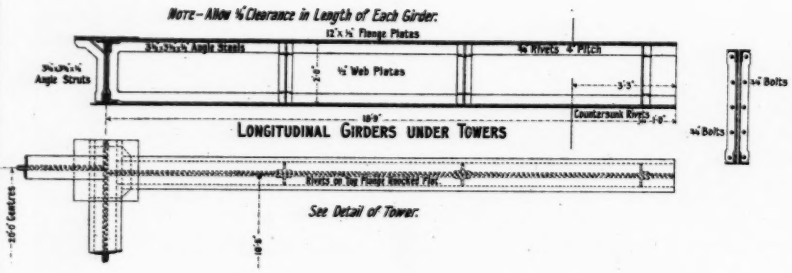
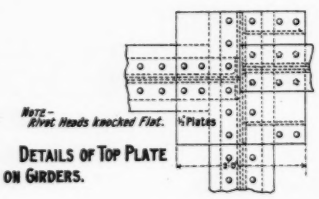
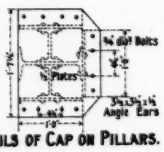
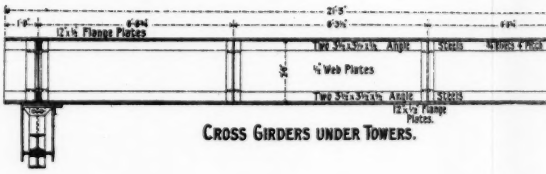
The Granton Works of the Edinburgh

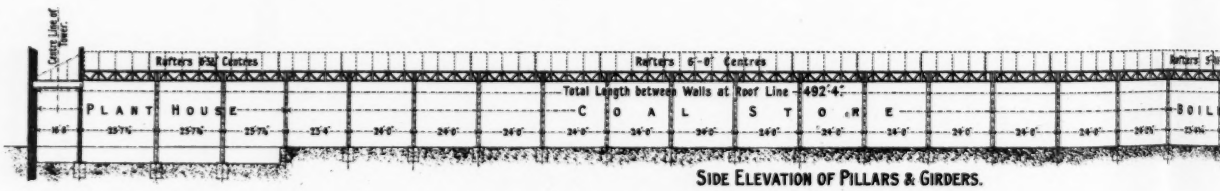

DETAILS OF ROOFS TO COAL STORE.
NOTE – Wood Purlins 4'-2½", 2'0" Centres. Angle Ears 3'-3"x3"x7" long with Two Holes for ⅜" Wood Screws 4½" Centres and Two ⅜" dia" Bolts for Rafter Back 2" Centres.
114 ORDINARY RAFTERS.
40 STRONG RAFTERS
TO DIMENSIONS PREFIXED BY S.R.
NOTE – Skylight Bars 2'0" Centres. Purlins 3'-3"x3" holed for ¾" dia" Bolts to Skylight Bars ⅜ Centres, ⅜" dia" Bolts to Angle Ears 4½" Centres, Ears to Purlins 6'-3"x3" Angles 7" long holed for ⅜" Bolts to Purlins and Rafter Backs 4½" & 2" Centres.
34'-5" Centres of Bolts
34'-8" Centre of Girder to Face of Wall

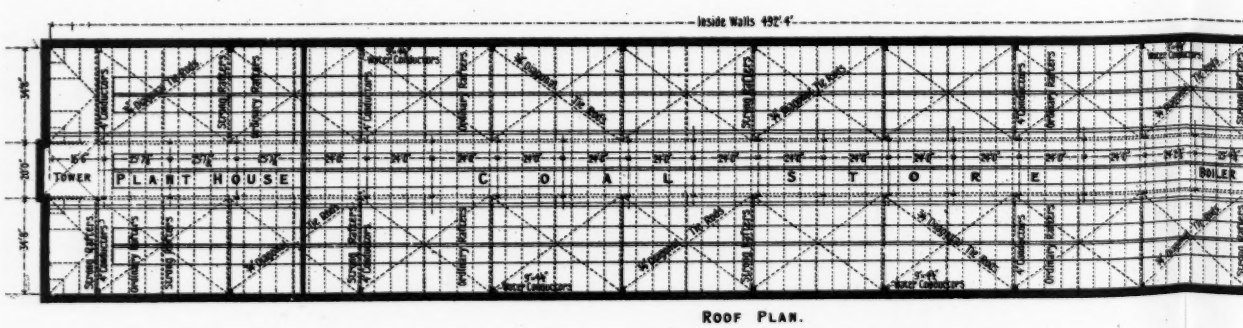

NOTE – Allow ¼ Clearance in Length of Each Girder.
LONGITUDINAL GIRDERS UNDER TOWERS
See Detail of Tower.
6 Girders 25'-7⅞ long
24 Girders 24'-0" long
4 Girders 23'-4¾ long
2 Girders 23'-4" long
2 Girders 24'-2½ long
LONGITUDINAL GIR








Rafters 9'3" Centres
Rafters 6'-0" Centres
Total Length between Walls at Roof Line 492'4"
PLANT HOUSE
COAL STORE
SIDE ELEVATION OF PILLARS & GIRDERS.



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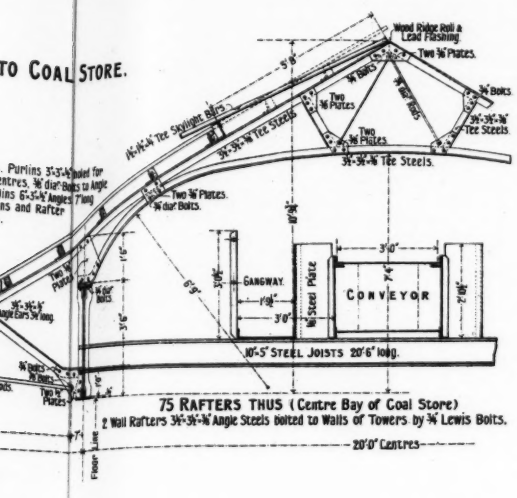
inburgh and Leith Gas Commissioners.

No. 8.

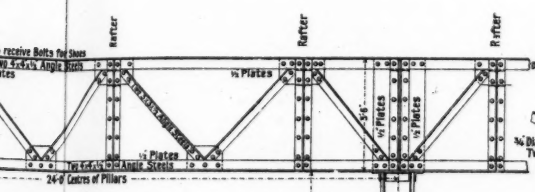
TO COAL STORE.



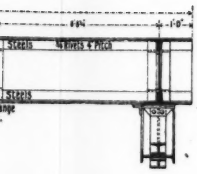
75 RAFTERS THUS (Centre Bay of Coal Store)

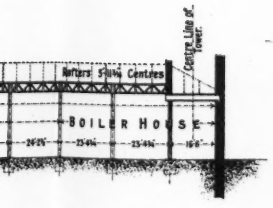
2 Wall Rafters 3½-3½-⅜ Angle Steels bolted to Walls of Towers by ¾ Lewis Bolts.

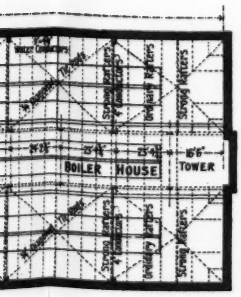
20'0" Centres

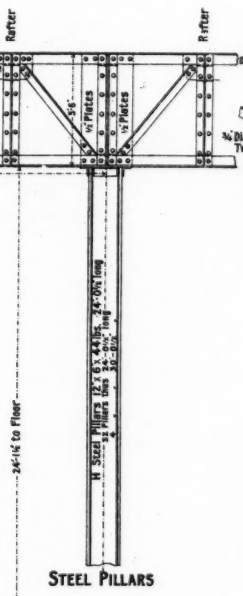


LONGITUDINAL GIRDERS

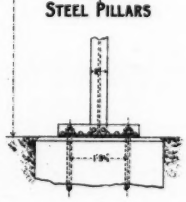


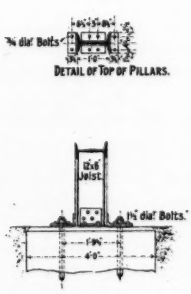






STEEL PILLARS

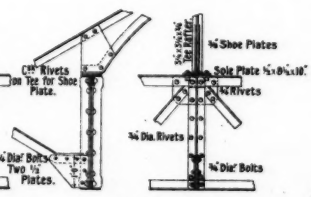




DETAIL OF TOP OF PILLARS.

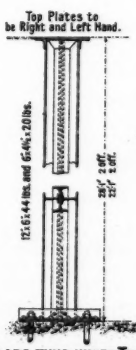
PLATE FOR UPPER CROSSING.

PLATE FOR UPPER TIE & DIAGONALS.



DETAILS AT TEE STRUTS & SHOES.

36 PLATE STEEL BASES.



4 PILLARS THUS UNDER TOWERS.

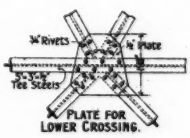
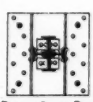


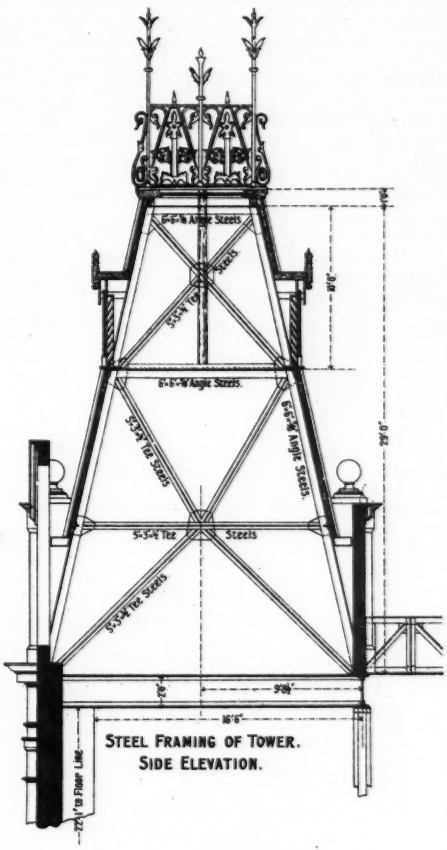
PLATE FOR LOWER CROSSING.



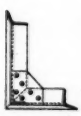
4 PLATE STEEL BASES.

DETAIL OF HOLES FOR SHOES

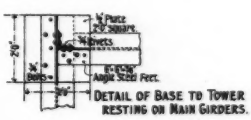
DETAILS OF TOWERS TO COAL STORE.



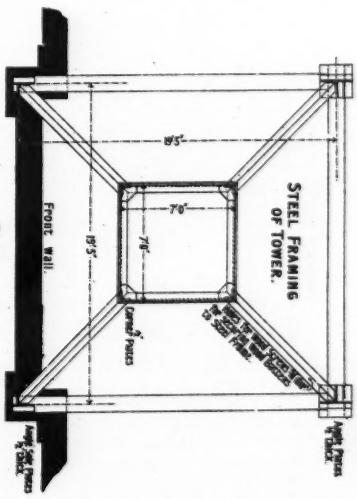
STEEL FRAMING OF TOWER. SIDE ELEVATION.



CORNER PLATE.



DETAIL OF BASE TO TOWER RESTING ON MAIN GIRDERS.



PLAN.

PLATE FOR HORIZONTAL TIE.

WALTER RALPH HERRING,

M.INST.C.E., *ENGINEER.*

was, therefore, divided by placing a double line of standards the whole length of the building, 24 feet apart centre to centre, on the top of which are mounted two lines of latticed girders running from gable to gable of the building.

Photograph No. 34 shows the interior of the coal-store with the concrete floor already laid, and the standards for supporting the roof girders lying in position preparatory to their erection.

Photograph No. 35 shows a considerable portion of this central bay erected, together with the joists in position for supporting the coal conveyor. The exact formation of the truss covering this central bay—which was specially designed in the manner shown—permits of a continuous conveyor being placed within the space, discharging the coal from spouts on either side; the coal in its fall lying in a line just clearing the underside of the longitudinal girders—falling by gravity, and forming a continuous slope to a point 5 feet up the side walls of the building, without any further manipulation than its natural discharge. The method of attachment to the truss on either side is shown on the details, Plate No. 8, from which it will be seen that the apex of all three roofs is on the same level, while considerable head-room has been left under the central bay for accommodating the coal conveyor and the operators attending it. The side-roof trusses rest upon the bottom flange of the longitudinal girder; while the central truss rests upon the upper flange. The rafter of the truss is continued and attached to the rafter of the side truss at a point about 4 ft. 6 in. up from the shoe. This method of jointing the roof together formed a very strong construction, and enabled the roofs to stand intact without being in any way dependent upon the strength of the side walls of the buildings for resistance to wind pressure, &c.

At either end of the block of buildings, a tower has been constructed. At the north end, this was a necessity to permit of the elevator feeding the coal-storing plant passing into the building at such a level as to enable it to be discharged upon the conveyor. An exactly similar tower was also constructed at the south end, for the sake of appearances and for ventilation. The details of these towers are shown upon the plate. The towers themselves were further shown on Photographs Nos. 18, 19, and 20 (*ante*, pp. 210-11).

In designing the buildings throughout the works, care has been taken to afford the greatest amount of natural light possible within all the buildings and structures. The illustration of the coal-store roof will show to what extent this has been done over these buildings, and more particularly Photograph No. 36 which shows the completed roofs and the full measure of light therein. The details of these sky-lights are shown upon the plate, consisting of the fixing in position at the ridge of the roof an angle steel on either side, within which a wooden ridge-roll piece is secured. About 6 feet down the slope of the roof, an inverted angle-steel is fixed, so that its table is projecting a little way above the top row of the slating. This is cleated to the back of the rafter by means of angle steel cleats. Small T-iron bars forming astragals are riveted through and between, with countersunk rivets to the angle-steel referred to. At the lower ends of the T-steel bars, the web is cut out a distance of 1½ inches, and the table turned up so as to prevent the glass that may be inserted between these astragals from sliding forward. The web of the T-steel is also drilled in four or five places, at such a point above the level of the glass and the junction beneath as to enable wood pegs to be driven in to secure the glass in position, and prevent it being raised by wind-pressure from beneath.

By this form of construction, there is sufficient area left between the underside of the glass and the upper row of slates to permit of air currents to ensure efficient ventilation without draught; the glass of the roof being made to overlap the slating sufficiently far to prevent the possibility of any damp or wet driving through the opening.

These roofs were originally designed to be slated on iron laths. The difficulty of procuring so many slates in a reasonable time necessitated the substituting of wooden purlins for the iron slate laths, supported upon angle-cleats at the back of each rafter, and close-boarding upon the wooden purlins, and finally covering with tarred felt and slates—this permitted of various sized slates being used.

PHOTOGRAPH No. 36.—Coal-store roof, with the coal conveyor supported within the central bay. (April 4, 1901.)

FOR THE REVIVAL OF APPRENTICESHIP.

It is desirable that from time to time the public should be reminded that the paths of modern progress are not the only walks of life, and that the ways of good men of old are still open to those who desire to be of service to their generation. It is sometimes made matter of complaint (and justly) that, in the crowd of modern interests and causes, the ideas of the Pious Founders of old, though far from being superseded by anything better, are in danger of being forgotten. We see, for example, a notorious philanthropist who apparently will only bestow of his superfluity for providing what he regards as a peculiar necessity of modern existence, though many equally competent judges do not agree with him. There can be nothing more distressing to witness than misdirected benefactions; and, apart altogether from the plentiful crop of millionaires, there is in these days such plenitude of resources which might be usefully employed in works of philanthropy and charity, that a little consideration of what might be usefully done with the money is called for. Writing for the gas industry, we have on previous occasions discussed the question of how the available resources of the individuals and organizations connected with the industry can be applied to such ancillary purposes, educational and other, as may appeal to those who feel that wealth and power have responsibilities besides their own increase and protection. Only last week, one such object was brought forward in the London newspapers, in respect to the much-debated question of the apprenticeship system.

It should not require argument to maintain the position that the preservation of the apprenticeship system in the case of skilled trades and handicrafts is one of the most important of national causes. Yet it is equally obvious that the system has been failing for years, for reasons which are not less deplorable

because they are perfectly good and natural in themselves. Without pretending to enumerate the whole of these contemporary influences inimical to the apprenticeship system, which have appeared from time to time in discussions on the subject, it will be sufficient to point to one of them, which has just cropped up again. It is the old difficulty of the finding of the premium, and the foregoing of the wages invariably required in the case of apprentices to skilled trades. The effect produced is that when poor lads leave the elementary school, while those who have succumbed to the temptations of pedagogism and what the late Mr. Gladstone called the "Pen and Ink Paradise," struggle on as pupil teachers or as clerks, the remainder "almost invariably recruit the army of errand boys or van guards at wages of from 8s. to 10s. a week, but without prospects for their future." The words are those of the head master of a London Board School, in the papers of the 11th inst. He goes on to state that he frequently urges upon parents of intelligent lads the duty of placing their boys in positions suited to their natural bent, and affording them some chance to rise above the stagnation of the unskilled labourer. The objection is raised, in almost every case, that the lad's wages are immediately required to help in maintaining the home, to say nothing of the obstacle of the small premium usually required on apprenticeship to a skilled trade. Consequently, a good tradesman is lost to the community for want of a little help at the proper time.

The difficulty is a very real and painful one, as most people who have any knowledge of the industrious poor are fully aware. Though many parents would gladly make great sacrifices in the way of dispensing with the boy's wages if they could only get the money wanted for the premium, the double necessity is too much for them. The pitifulness of the circumstances is increased by the self-respecting reserve of most hardworking people in regard to the acceptance of charity of the usual kind. Mr. Mawbey, the Board School master already quoted, thinks the assistance would on this account have to be given in the form of a loan for future repayment. This is a very debateable point. There are grave objections to starting a lad in life under the shadow of borrowed money; and the effects of making borrowing for any object easy to the poor are of a questionable character. On the other hand, it is not found that in old cathedral and country towns, where apprenticeship money is given in memory of ancient benefactors, any obloquy attaches to the reception of the gifts. What has been wrong and shameful in this connection is usually the misappropriation of the bequests that has too often been perpetrated by the trustees, so that in many instances the funds have disappeared altogether or are woefully diminished. And what was left was systematically appropriated to other purposes by the Charity Commissioners, acting on the economical principles of the school of Mill and his fellow-doctrinaires. There are, however, many instances still left where the intentions of the Pious Founders are still religiously carried out, and generation after generation of good workmen are made by the help of a dole which, in the minds of the poor, is as much a gift of God as the sun and the rain.

The time is ripe for a thorough reconsideration of this subject in the light of facts. Unless the good British workman is to become extinct, he must be aided in overcoming the initial difficulties of his industrial life. These are many and great; and it is of the first importance that they should be distinguished and dealt with in their proper order. This is a duty to the State which, it appears to us, might unite employers and Trade Unions of skilled handicrafts with all those who desire the good of the nation. There should be a real conference of interested persons of every degree, with the objects of ascertaining the needs of British industry in this regard, and suggesting ways of satisfying them. So far as the gas industry is concerned, there should undoubtedly be a wider recognition than has hitherto prevailed of the duty of helping the capable sons of both skilled and unskilled employees in gas-works to learn useful trades. This is a duty in which, for many reasons, the Metropolis and the great towns must be associated with the country generally. London, to put it shortly, is the place for the most efficient workers the world produces; and if these are not bred and trained in these islands, they will be imported. Rent and other working expenses are so high, that nothing short of the most productive labour can support itself. On the other hand, there is to be considered the centrifugal force which drives so many trades out into rural localities, where the necessary working population has to be artificially planted. On the whole, it is probable that the training-ground for artisans doing the best work of their lives in London will continue to be in the country, as it has been in the past. Therefore, the City Companies, and the great employers of labour, and all who contemplate the encouragement of the British workman in his early days, must stretch out their hands into the quiet towns where there is still room for the apprentice to learn his trade.

The great need of the age in this respect is for the right kind and amount of help for likely lads leaving the elementary school to put them to a "good trade," as the old phrase goes. It is unfair to lay all the blame upon the Board and other schools for turning the most capable boys into clerks, and fixing their aspirations upon some unproductive employment to be gained by passing an examination, when there is really no alternative open to them. Of course, the apprenticeship system in olden times was abused; but that is not sufficient reason for sacrificing all the good there was in it. An uneasy feeling that something was lacking has of late years caused the multiplication of technical instruction agencies and trade schools; but these can never make workmen. While the sharp boy is carrying telegrams, or going errands, or minding a van, he is not learning a trade; and the awkward fact has to be faced that in town there is more demand for lads in these occupations than there are permanent berths to follow. The thoughts of the judicious philanthropist, who truly desires to help his kind, should keep well to the front the difference between the producer and the non-producer in the working world. It is a difference that is often misunderstood and pushed to unjustifiable conclusions; but nevertheless it is one that cannot be neglected, at the risk of dreadful disaster. Now, the accidental connection between elementary schooling and non-productive employment is one of the dangers of the kind of civilization in which we live. Education is a fine thing in its way; but the University is no compensation for the uncultivated field, the neglected mine, and the unprosperous workshop. If the present direction of much of what passes for progress in civilization is not altered, the time will come when ten doctors of science will be accounted of less worth than one ploughman. Naturally, the poorest countries of the world will be the first to feel this effect; and it is pretty clear that Greece and Italy are already within measurable distance of proving it. We cannot but think that a conference on the subject of apprenticeship would be a useful preparation for such a reawakening of public interest in the whole question as would be likely to result in many examples of a return to the ways of the benefactors of a prior age.

ELECTRIC LIGHTING MEMORANDA.

A Weakness of Electricians—Abandonment of Electric Lifts by the Central London Railway Company—Vitality of the Omnibus Trade—Failure of Electrical Prophecies—The Progressive View of the Marylebone Award.

It is a weakness of electricians of the more sanguine order to attach to the success of electrical enterprises the assumed consequence of the decadence and eventual disappearance of competing forms of industry. This was notoriously so in the early days of electric lighting, when those who appropriated the novelty for their own advancement never lost an opportunity for predicting the speedy decline and extinction of gas. Nor has the trick been quite abandoned by the more hare-brained of our electrical enthusiasts; for we noticed recently in a trade periodical some would-be "superior" remarks on a municipal gas-works loan, implying that fifty years was a long lease to assign to the continued employment of gas for lighting. As a rule, however, the persistent growth of the gas industry has imposed silence as regards the date of its decline and fall on most electrical partisans, who have otherwise occupied themselves with preparations for entering into the inheritance of the railway and tramway companies. Similarly, the idea that any other means of transmitting and applying "power" could live beside electricity, has been treated in the same quarters as all too absurd. Whatever might for the time being be true of the continued vitality of the gas industry, it has been forced into a commonplace of "advanced" mechanical engineering, that electric power is alone worth thinking about to-day.

It must come like a cold douche upon these anticipations and prognostications, to learn that the Central London Railway Company—the far-famed "Twopenny Tube" line—have decided to abandon the electric lifts at their stations on account of the great expense, and instal hydraulic lifts in their stead. A beginning has been made at the Shepherd's Bush terminus; and the economy to be effected when all the passenger lifts have been altered to hydraulic power is expected to be considerable. In connection with this experience of the Central London Railway, it is worthy of remark that neither the "tube," nor its feeding electric tramway services have succeeded in running the much-abused omnibuses off the roads. The Metropolitan omnibus trade is again doing as well as usual; the numerous firms and companies engaged in this business having recovered themselves wonderfully during the past year. Of course, there are many reasons for this satisfactory state of the trade. The working expenses of horse traction are considerably less, owing to the cessation of the war demand for horseflesh and fodder; and in the Metropolitan district the range of possibility for the creation of new routes, and the trial of cross services, is practically inexhaustible.

Not the least of the reasons for the continued popularity of the omnibuses, however, is the discovery on the part of the public that in many respects this service is preferable to either the subterranean tube or the electric tram. Inasmuch as there is no monopoly in this branch of the public service, not even where the trams are worked by the local authority, the people will continue to exercise their right to travel as they like. The actual proof of this fact is something that a very short time ago would have been scouted by perfervid electricians and the amateurs of the London County Council as impossible. But the truth is what has all along been confidently held by many—the "Journal" among the number. Our reason for reserving confidence in the

prospect of electric tramway traction on the Metropolitan lines was, and is, that, in the circumstances, the chief attraction of electric haulage—high speed—is denied by the necessity of sharing the road with every kind of traffic. This fundamental consideration has been expressed in these columns over and over again for years; and now its force is being experienced. We can refer for an example to the ridiculous, as well as painful, exhibition of the road traffic past the Brentford Gas-Works. The only opportunity open to electric trams is on a clear road; and the drawback to that is that clear roads do not provide many passengers.

Besides, electric traction is not cheap, either in the tube or on the tramway; and it only pays where there is any amount of traffic to support it. In the same circumstances, of course, the omnibuses can pick up a living also. We mention these things here, in order to show that the inveterate notion of the electrical interest that it is bound to supersede every rival for the patronage of the public is baseless. If our friends the electricians would only rest content to drive their own wheelbarrows, and leave other people to push theirs, they would find their advantage in this measure of modesty and attention to business. They would not find it worth while to utter so many falsehoods, for one thing; and would in time become better shopkeepers, because they would learn that the prophetic mantle does not become the man who has to wear an apron like his fellows if he is to live.

The amazing Marylebone award is greatly exercising the minds of interested parties, and many are looking forward with keen expectation to the meeting of the Borough Council at which the matter will be considered. The advocates of municipal trading are evidently at their wits' end to show that the Marylebone Borough Council ought to go into the business of electricity supply on the only terms possible in the circumstances. The task is not an easy one. Indeed, it is impossible. The "Municipal Journal," which makes a speciality of encouraging Progressivism on the part of local authorities, is fain to confess that the case is hopeless. What with the price to be paid to the Company for their property—of which even this great authority dares not dispute the fairness—and the cost of necessary new works, the undertaking will stand the borough in £1,500,000 of capital by the end of the first year. Taking credit for an increase of profit for the year, the amount to be netted by the Council works out at £69,636. Six per cent. on the capital is £71,720, which is £2064 to the bad, as the prize of municipalization! It is admitted that the Council cannot hope to reduce the price of current, which is already under 5d. per unit for private consumers. The Company's charge for public lighting is less than 2d. per unit, which is under the charge in the City. Yet this is the Company which the same writer accuses of being an "oppressive monopoly," and appears to think unworthy to exist because the Borough Council have been "on bad terms" with them for several years! Where is the oppression on the part of the Company, and what can be the gains of municipalization? The obvious truth of the matter is that the Borough Council have been excessively foolish in being led away by rash counsellors to "bite off more than they can chew." This is what comes of a Local Authority treating its prejudices and fancies against a Company as solid facts. It is the ratepayers, who have been betrayed by the foolishness of their representatives, who deserve sympathy; while instead of dispossessing the Company of their property, the Borough Council ought to be cleared out and filled with sensible men. As the Act stands, the award must be given its effect; but if the ratepayers take their business into their own hands, the Act cannot be enforced against them before there is a chance of repealing it.

RATING OF ELECTRICITY UNDERTAKINGS.

It has been a matter of adverse comment at recent meetings of shareholders of electricity supply companies that the basis of the assessment of their undertakings has greatly increased; and many appeals against assessments have consequently been heard. The rating question is now, therefore, receiving considerable attention; and, in view of this fact, interest attaches to a booklet dealing with it which has just been published by Mr. W. G. Bond.* The author does not intend his work to be regarded as a treatise on rating, but merely as a brief exposition of the principles underlying our system (if it can be so called), and a guide to the origin and utility of what he calls "the ingenious hypotheses which have been invoked to make twentieth century practice square with Elizabethan principles." Though the special subject dealt with is the rating of electric and tramway undertakings, Mr. Bond is hopeful that directors and officials of other public supply companies will find assistance from his labours. He shows first who are the rating authority, and then indicates the steps to be taken by an objector to an assessment, and the tribunal to deal with his complaint. The term "rateable value" and the method of determining it are explained; and specimen valuations of a tramway and a lighting undertaking, with notes thereon, are given, as well as tables of assessments. The author has presented, in a concise form, the principles applied to rating; and those who desire to study the subject more thoroughly are referred to large works (those of Boyle, Castle, and Newbigging), a list of which he gives.

* "The Rating of Electric Lighting, Electric Tramway, and Similar Undertakings." By W. G. Bond. London: "The Electrician" Printing and Publishing Company, Limited; 1903.

PERSONAL.

Mr. J. Brettell, who has been for some time Assistant to Mr. G. Hancock at the Sedgley Gas-Works, has been appointed Manager, on the resignation of that gentleman after many years' service.

We learn that the vacancy caused at Dungannon by the death of Mr. R. Ross, to which reference was made last week, has been filled by the appointment, out of a large number of applicants, of Mr. J. Taylor, of Limavady.

Mr. F. W. Lillicrap, the Assistant Water Engineer to the Plymouth Corporation, has been appointed Manager of the Devonport Corporation Water-Works. There were 151 candidates for the position, the salary of which is £250 a year.

The various functions in connection with the inauguration of Mr. Alexander C. Humphreys as President of the Stevens Institute of Technology, in succession to the late Professor Henry Morton, were fixed to take place early this month.

NOTES.

Preventing Electrolysis of Gas and Water Pipes.

A writer in "Cassier's Magazine" points out that it has been suggested recently that damage to pipes from electrolysis may be averted by insulating the joints at more or less frequent intervals, so that they shall offer a poor path for the return of stray currents. It would seem, however, that this plan would be available at best only in the case of new pipe-lines, or in single instances, for it would not be practicable to disturb the entire pipe system of a city to insulate the joints. Besides, it has yet to be demonstrated that a durable insulating joint for gas and water pipes is procurable. Vulcanized fibre has been proposed, and, in fact, tried with some success for such joints; but this material does not, he says, yet meet the general approval of gas engineers. Perhaps relief from electrolytic damage of the nature in question may ultimately come by the compulsory employment of the double trolley system, or by the adoption of the alternating current, when a practical alternating-current system and single-phase motor shall have evolved, in place of the direct-current systems and motors now almost universally employed for electric traction purposes. He thinks it is within the possibilities that this consummation is not so remote as may be generally thought; a single-trolley railroad in which single-phase motors will be employed having already been contracted for to connect the cities of Washington, Baltimore, and Annapolis.

Importance of Moist Air in Dwelling-Rooms.

A communication in "Der Gastechniker" refers to the above question—which is especially important for comfort, where stoves are used in place of open fires for heating dwelling-rooms—of the regulation of the percentage of moisture in the air. Room air should, for health, be at a temperature of 65° to 68° Fahr.; and there should be in it not less than 40 nor more than 80 per cent. of the moisture which it is capable of holding at the temperature. If the air of the room contains less than 40 per cent. of aqueous vapour, it takes up moisture wherever it finds it—*e.g.*, from man. The increased evaporation from the skin and lungs withdraws much heat from the system, and raises the need for warmth. Less oxygen is inhaled, the change of substance is slower, and the appetite thereupon declines. The colder the outer air is, the less aqueous vapour it contains. For this reason it does not conduce in the least to the improvement of the degree of moisture of the room air if fresh cold air is admitted by opening the windows. Of many patterns of apparatus for humidifying the air, one devised by Dr. A Katz, of Waiblingen, is said to be characterized by simplicity and satisfactory behaviour. It consists of a water-vessel, having suspended over it a number of highly absorbent moistening sheets having their lower ends in the water, which they suck up by capillary attraction. The dry, warm air, passing between the moist sheets, withdraws from them the necessary amount of water, so that in a few minutes the proportion of moisture in the air becomes appreciably improved.

Some Useful Recipes.

Recent numbers of "Cosmos" contained the following recipes: A cement for cast-iron can be made with 30 parts of iron filings and one part each of sal ammoniac, flowers of sulphur, and vinegar, or a few drops of sulphuric acid instead of the last ingredient. The cement is employed for filling blisters in the metal. A cement suitable for glass and copper tubes may be made by taking plaster in fine powder and diluting it with machine oil. When the paste becomes thick, white of egg should be added in the proportion of about 100 parts to 50 parts of oil. The mixture should be made in a mortar with a pestle, to avoid the foam which egg would produce. This cement should be employed as soon as made, as it hardens rapidly. When the tube is sealed in the socket, it must be left for a few hours before being used. Cement made as described acquires in air, and especially in heat, so great a degree of hardness that the glass cannot be removed without being broken. A brilliant black for iron or steel may be

made by boiling one part of sulphur in ten parts of spirit of turpentine. This produces a sulphurous oil with unpleasant odour. It should be spread as lightly as possible with a brush, and the metal heated in the flame of an alcohol lamp until it acquires the necessary tint. This produces a brilliant black of extreme solidity on iron and steel. If merely an oxidized bronze colour is needed, the metal is dipped into melted sulphur mixed with smoke black, or a liquid containing flowers of sulphur mixed therewith. It is then allowed to dry. Bronzing thus made resists acid, and will take a fine polish, due perhaps to the formation of sulphide of iron.

Highest Head of Water Power in Existence.

An example of the rapid progress that is being made with the utilization of the hitherto waste water powers of Switzerland is the power plant at Vouvry, which has the distinction of having the highest head of all plants of the kind yet developed, certainly if taken in connection with the large scale of the scheme. The total working head of water available is 950 metres, or 3117 feet; and the plans contemplate the production of a total of 10,000-horse power; but only 2000-horse power is provided for by the works executed. A natural reservoir exists in Lake Tauay, which has a superficial area of 111 acres, and receives the drainage of a watershed of 1850 acres. According to M. Boucher, the author of the project, the total volume of water available will be 2900 million gallons annually, or a mean flow of 12·3 cubic feet of water per second. With the stated head, and allowing for turbine and other like losses, the normal power of the fall would be some 3100-horse power for a constant rate of discharge. Lake Tauay can, however, be regarded as a natural reservoir; so that the amount of power available will vary with the number of hours per annum during which the water is drawn off. The Vouvry plant has been planned to reinforce a water-power plant at Vuarguy, in the Rhone Valley: which supplies electric energy for lighting and power purposes through 80 miles of line, serving about 20,000 lamps of 10-candle power, and 450-horse power in motors. The pressure mains are under a maximum strain at the bottom of the descent of 10,667 lbs. per square inch. They are 0·71 inch thick, made of welded Siemens-Martin steel. The turbines are of the Pelton type, in 500-horse power units. The capital cost of the plant, including the acquisition of the water rights, was about £32,000, which for 2000-horse power works out to £16 per horse power. When other four turbines are added, the cost will be reduced to £11 per horse power.

Gas-Engines for Pumping Water.—In the "JOURNAL" for the 4th of November last, we recorded the opening of water-works for the supply of Madeley and Broseley, in Shropshire. An interesting feature of the works was the gas-driven pumping plant—the largest in the country operated in this way—which was furnished by Messrs. Crossley Bros., Limited, of Manchester; the pumps being made by Messrs. F. Pearn and Co., Limited, of West Gorton, Manchester. From an illustrated description of the works in the "Engineer," we learn that the gas-producing plant is of the Dowson type, and consists of a small vertical boiler, generator, hydraulic box, and coke and sawdust scrubbers. It is capable of producing sufficient gas for a maximum of about 90 brake horse power per hour. A gasholder, 10 feet in diameter and 8 feet deep, is fixed outside the engine-house. The plant is in duplicate, with the exception of the holder. The two engines are each of 90-horse power; and the pumps are three-throw, 10$2\frac{1}{2}$ inches in diameter and 24-inch stroke. They are each capable of lifting 20,834 gallons of water per hour from the well 142 ft. 9 in. deep, and delivering it into a tank below the engine-room floor, whence another set of three-throw pumps, 9$\frac{1}{2}$ inches in diameter and 24-inch stroke, lift it through the rising-mains to the reservoirs.

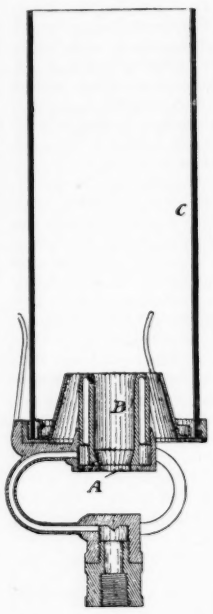
Estimating the Illuminating Power of Gas.—Owing to the diversity of opinion which has been widely expressed as to the correct method of estimating the illuminating power of gases, Mr. W. J. Dibdin, F.I.C., has prepared a table based on the law enunciated by the late Dr. Pole, F.R.S., by means of which the true illuminating power of any gas may, it is claimed, be determined. This important law was deduced more than thirty years ago; but owing to its complicated character, it is asserted, it has been little understood, and is considered to be far too involved to render it practicable for ordinary use. By means of an ingenious arrangement, however, Mr. Dibdin's table indicates almost at a glance the true illuminating power of practically any gas with the same facility that a rule-of-three calculation is made on the slide-rule; the photometrical observations involved being but very slightly more than is necessary with the ordinary methods now in use. The table is applicable for any gas, whatever the illuminating power, provided the standard rate of consumption is the usual parliamentary one of 5 cubic feet per hour. The table is printed on stiff board and framed, and is accompanied by a descriptive pamphlet fully explaining the law, the table calculated therefrom, with a number of illustrations of its working, and an abstract from the table, which is suitable for directly reading the illuminating values of gases such as are ordinarily met with in gas-works practice, in a manner comparable to the method of ascertaining the "Tabular Number" for correcting the volume of a gas and standard temperature and pressure.

TECHNICAL RECORD.

AN IMPROVED TEST-BURNER.

Among the patent specifications issued last week, was one for an "Improved Argand Burner for Gas-Testing," the invention of Mr. Walter Grafton. It is shown in the annexed illustration.

The patentee begins by pointing out that the illumination of a gas-flame is dependent upon the quantity of air supplied to the burner, and means must be provided to properly distribute the air to the gas "to effect a thoroughly brilliant and maximum incandescent flame." As in Sugg's "London" argand, the improved burner consists of an annular hollow steatite ring B (pierced with holes on its upper surface for the egress of the gas) connected with a metal body having three supply-tubes terminating in a $\frac{3}{8}$-inch socket. A gallery resting upon the supply-tubes serves to carry a glass chimney and a metallic cone. The gas issuing from the many orifices at once coalesces, and produces a hollow cylindrical flame. A chimney C (of suitable dimensions) serves to induct the necessary quantity of air; this being governed to some extent by the internal diameter of the annular steatite chamber B and the metallic cone, which direct the air to the flame.



The dimensions of the burner are:—

Diameter of the supply-pipes	0·08 inch
External diameter of the annular steatite chamber	0·84 ,,
Internal diameter of the annular steatite chamber at the upper end B.	0·48 ,,

The internal diameter of this annular steatite chamber is reduced at the lower end A either by inserting a metal reducing piece—tapered internally upwards for fully three-fourths of its length—of $\frac{1}{4}$ inch long, or by gradually reducing, from a point commencing at $\frac{1}{4}$ inch off the bottom including the seating of metal body, the internal diameter of the air-passage way in the steatite chamber at its lower end A to about 0·37 inch. When $\frac{3}{8}$ inch from the actual bottom, the internal diameter at A is of uniform size—*i.e.*, of practically 0·37 inch. The number of holes in the steatite ring is 24.

Diameter of each hole	0·045 inches
Internal diameter of cone, at the top	1·080 ,,
,, ,, ,, at the bottom	1·500 ,,
Height of upper surface of cone and of steatite chamber above the floor of the gallery	0·750 ,,
Height of glass chimney, according to the kind and quality of gas to be tested—namely, for coal gas of 16·75 candles and under, when consumed at such a rate as shall give a light equal to 16 candles	6·000 ,,
For coal gas of such quality when burnt at such a rate as shall give a light equal to 14 candles	5 000 ,,

When used for mixtures of coal and carburetted water gas—when consumed at such a rate as shall give a light equal to 16 candles—having the following so-called qualities:—

Mixtures of above 17 candles	6·0 inches
Mixtures of from 17 to 16 candles	5·5 ,,
Mixtures under 16 candles	5·0 ,,
But for mixtures of 14 candles and under, when tested to give a light equal to 14 candles	4·5 ,,
For carburetted water gas of so-called 14 candles, when consumed at such a rate as shall give a light equal to 14 candles	4·0 ,,
Internal diameter of chimney in all cases	$1\frac{3}{8}$,,

The invention is said to be particularly applicable for testing all illuminating gas of 17 candles and under this quality, as at present determined by Sugg's "London" argand No. 1, on the 16 or 14 candle or other flame basis. The patentee finds that with ordinary gas he obtains "greatly increased candle power with a diminished consumption of gas by the better regulation of the air entering the burner, necessary for the combustion of the gas—thus securing the highest illuminosity."

As an example of how to apply the invention, he suggests reducing the internal or central air-passage B. of the No. 1 "London" argand (say) by a small annular reducing-piece having an inlet internal diameter of 0·36 inch to 0·39 inch, but preferably 0·37 inch, and using (say) for 14-candle gas a 5-inch by 2-inch external diameter chimney. This produces from 5 to 10 per cent. or more rise in the illuminating value of the gas, which is the maximum, as compared with the result now obtained with Sugg's "London" argand No. 1.

LONDON AND SOUTHERN DISTRICT JUNIOR GAS ASSOCIATION.

The first Annual General Meeting of this Association was held at the Polytechnic Institute, Regent Street, last Friday—Mr. Walter Grafton, F.C.S., the President, in the chair. There was a good muster of members, and the meeting was very successful. After the minutes of the preliminary meeting had been confirmed, the rules drawn up by the Council were discussed, and were passed with slight modifications. It was unanimously decided—"That the membership of the Association shall be confined to persons engaged in (*a*) the manufacture and distribution of illuminating gas, and (*b*) the working up of the products obtained therefrom." The President next read letters from Sir George Livesey, Mr. F. S. Cripps, Mr. A. Dougall, Mr. J. W. Helps, Mr. Charles Hunt, Mr. H. E. Jones, Mr. S. Y. Shoubridge, Mr. E. H. Stevenson, and Mr. W. A. Valon, wishing the Association success, and consenting to become honorary patrons. The meeting was brought to a conclusion by the passing of a hearty vote of thanks to the President and members of the Council for the trouble they had taken in the formation of the Association. The next meeting will be held on Friday, the 13th prox., for which a paper has been promised by a member.

JUNIOR INSTITUTION OF ENGINEERS.

At a Meeting of this Institution held at the Westminster Palace Hotel on the 6th inst., a paper on "The Calorimetry of Gaseous and Liquid Fuels" was read by Mr. W. Garnet Wernham. After emphasizing the importance of means for conducting a rapid and simple test of the heating value of fuels, the methods employed were described in detail. The first—the analytical method—was stated to be more suitable to the laboratory; but, where carefully carried out, it was extremely valuable for checking the result obtained by the direct calorimetric test. The latter method was next investigated; the calorimeters of Rumford, Fabre and Silbermann, and Berthelot being first illustrated, being distinct from instruments of the Hartley or flowing-water type. Several of these instruments—the Hartley, Junkers, and Simmance and Abady calorimeters—were explained in detail, and a description of a test with the last-named instrument was given. The calorimetry of liquid fuels was next considered, and the methods of burning the oil were described; the analytical test being unreliable for this class of fuel. The question of the standardization of calorimeters was entered into; the author suggesting that an efficiency test should be made with gas of known heating value, such as hydrogen or pentane air gas, and a constant given for each instrument. In conclusion, a plea was put forward for uniformity in methods of expressing calorific values; the English and French units being at present used together in a manner calculated to cause great confusion. An animated discussion followed; and the meeting closed with the announcement of a visit on the 21st inst. to the East Greenwich station of the South Metropolitan Gas Company.

ANOTHER IRISH GAS ASSOCIATION.

In response to invitations issued towards the close of last year by Mr. J. G. Tooms, the Resident Manager of the Waterford Gas-Works, several of the managers of gas-works in towns in the South-East of Ireland met at his works to form and inaugurate an Association to be composed of members resident in the district. The main objects of the promoters—viz., the holding of frequent meetings in different places easily accessible to the members, so as to afford them opportunities of conferring with each other on matters relating to their business—were stated by Mr. Tooms; and the result was a decision to regard Waterford as the centre of operations, and to hold two meetings there in the winter six months, and two elsewhere during the summer. The new Association was then constituted; the following being appointed officers: President, Mr. R. Bruce Anderson, of Westminster; Vice-President, Mr. J. Paterson, of Tipperary; Hon. Treasurer and Secretary, Mr. G. Lennon, of Dungarvan; Committee, Messrs. J. Richmond (of Kilkenny), and Jer. Grant (of Fermoy); Auditor, Mr. A. Kirkham, of Tramore. Suitable rules and regulations, based mainly upon those of the Irish Association of Gas Managers, were next adopted. Two of them were of a somewhat unusual character. By the first, any member called upon by the Secretary to contribute a paper must comply; and, by the second, every member undertakes to join in each discussion. The active work of the new Association was inaugurated by the delivery by the President of a lecture, with experiments, on "The Principles Involved in Combustion;" after which Mr. Richmond opened a discussion on the subject of the tools employed in gas-works, which elicited varied opinions. After the meeting, the members were entertained to "high tea" by Mr. Tooms; and before separating they inspected an admirable installation of Sugg's intensified gas lighting at a local drapery establishment.

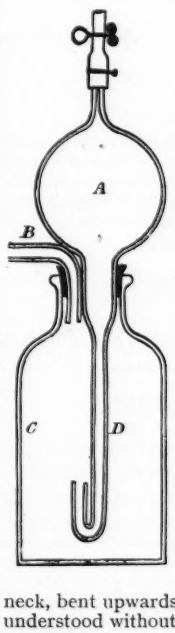
The second meeting of the Association was held on the 5th inst., when, in accordance with the arrangement come to on the previous occasion, the members assembled at the Waterford Gas-Works. An hour was usefully spent inspecting the works; and then the members were entertained to luncheon by the President. At two o'clock they assembled in the Board-room for the transaction of business. Mr. Anderson did not deliver any formal address, but furnished some notes upon pressure and pressure taking, giving a few practical illustrations. They provoked an interesting discussion, in which all took part. Mr. D. W. Tooms, of Mallow, followed with a humorous description of his experience—almost unprecedented—in that town, where during his first year, which has just closed, he succeeded in practically doubling his output of gas. A feature of the meeting was the formation of a lending circulating library—each member placing at the disposal of the others such books relative to the gas industry as he could spare from his shelves.

The membership of the Association comprises, in addition to the gentlemen already named, the following: Mr. George Anderson (honorary); Messrs. T. A. Godwin and T. Jonas, of Waterford; Mr. H. Kirkham, of New Ross; Mr. G. W. Norman, of Dublin; Mr. W. Paterson, of Bagnalstown; and Mr. J. F. Tyndall, of Carrick-on-Suir. On the invitation of Mr. Richmond, the next meeting will be held at Kilkenny, some time in April, when he hopes to be able to show the members a gasholder in course of being telescoped.

MODIFICATIONS OF HEMPEL'S GAS APPARATUS.

The "Proceedings of the American Academy of Arts and Sciences" recently contained the following contribution by Mr. T. W. Richards, of the Chemical Laboratory of Harvard College. The object of the paper was to describe some simple devices whereby it is possible to make accurate analyses of gases with a minimum of special apparatus.

Absorbing Pipette.—The essential feature of Hempel's method is the use of simply constructed vessels, distinct from the measuring burette, for the purpose of absorbing successively the various constituents of a gaseous mixture. Hempel used for the purpose a modification of Ettling's gas-pipette, which answers the purpose admirably; but, of course, many other combinations of apparatus might be used. The simplest is perhaps a bulb or wide tube inserted over liquid contained in a bottle. A satisfactory form of the apparatus is shown in the accompanying figure. Fifty cubic centimetres of gas are enough for analysis, if a suitably narrow burette is used for the measurement. Hence the receiving bulb of the pipette A need not exceed 75 c.c. in capacity. The bottle C should be capable of holding 150 c.c. in this case. The "compound pipette" of Hempel may be imitated by the addition at B of another bottle containing water and a levelling funnel, or the same object may be attained by merely connecting to the outlet B a flexible rubber bulb, such as a child's toy balloon. For solids, the stem D of the pipette may be made of wider tubing, closed at the bottom with a perforated stopper. A small tube bent upwards may be inserted in this perforation, if special precaution against incoming air is desired. An explosion pipette could be made of similar apparatus, with the addition of a stopcock just below the bulb A and the usual conducting wires. The pipette for fuming acid might be made with a ground-glass joint instead of a stopper to connect the bulb with the bottle. In that case, the bottle should be provided with a suitable side tube on the neck, bent upwards. The method of using these pipettes will be understood without difficulty by any one familiar with the Hempel apparatus.



Measuring Apparatus.—The most serious cause of error in Hempel's ordinary apparatus is due to the possible change of temperature. This is considerably greater than the probable error in reading; for a single degree Celsius causes an error of 0·5 per cent. of the total volume of gas measured under ordinary conditions, while the volume is easily read within 0·05 per cent. Hence, unless much greater care than usual is taken to preserve constant temperature, the reading of the volume is unnecessarily precise. But Hempel's ingenious arrangements for maintaining constant conditions in a 100 c.c. burette are so large as to be inconvenient for students' use in cramped quarters. For these reasons the author has often used somewhat smaller volumes, which may be surrounded with an envelope of water without producing thereby an unwieldy combination. An ordinary 50 c.c. burette, inverted and provided with a levelling bulb or funnel,

answers very well as a measuring instrument. The burette may even be used in its usual position, if it is provided above with a smooth rubber stopper with a single hole for the capillary connecting tube. Of course, the stopper is always pushed precisely into a definite position, indicated by a carefully made mark on the burette. There is little risk of displacing this stopper if it is firmly wired into its place. In any case, of course, the ungraduated space at the upper extremity must be carefully calibrated. An especially made 50 c.c. instrument, graduated all the way to the capillary tube at the top, is more convenient, although no more accurate, than the inverted burette. For convenience in cleaning, it is well not to have both ends of the burette drawn down to small diameter. The small size of the burette makes it easily possible to provide the water-jacket which is so essential for accurate work, and both burette and pipette may be supported upon the ordinary iron ring-stand.

Practical Operation.—Of course, the precautions usually necessary in gas analysis must be used in all the operations with this apparatus. For example, due time must be allowed for the running down of the liquid from the moistened walls. Again, care must be taken that the same amount of gas, at definite pressure (as small an amount as possible), is always left in the connecting capillary tubes.

While the apparatus thus constituted was devised primarily for use in an emergency, it has several advantages over the Hempel apparatus. It dispenses with the necessity of calibrating the whole length of a new burette, it is very inexpensive, and it occupies but little space. Each student may possess a complete set of apparatus, and every one knows the value from a pedagogic standpoint of such a possibility. A further advantage lies in the fact that the pipette is easy to fill and to clean; and a precipitate in the liquid is not apt to clog its working. The short, straight capillary brings an obvious gain of speed in transferring. Moreover, because of this speed, and the fact that the pressure during transference is always from the outside inward, the danger of loss by leakage is considerably less than it is with Hempel's apparatus.

In presenting for general use any new instrument, one must record its practical working in the laboratory. Everybody knows that plausible inventions do not always stand the test of indiscriminate use. Accordingly a large class in gas analysis was asked to use the new devices, with the favourable results shown in the following table (the figures being cubic centimetres):—

Analysis of Known Mixtures of Air and Carbon Dioxide.

Volume of CO_2 Taken.	Volume of Air Taken.	Volume of Air Found.	Error.
16·95 ..	32·02 ..	32·01 ..	−0·01
18·45 ..	32·21 ..	32·12 ..	−0·09
12·20 ..	42·20 ..	42·20 ..	±0·00
20·00 ..	32·00 ..	32·10 ..	+0·10
14·90 ..	37·60 ..	37·60 ..	±0·00
13·00 ..	34·50 ..	34·48 ..	−0·02
16·50 ..	36·50 ..	36·55 ..	+0·05

Excess of positive over negative errors, 0·03.

The pipette and burette were tested as follows: A definite amount of air was run into the burette, and the volume measured with the usual care. Pure carbon dioxide was then run in from a generator, and the gain in volume was noted. This known mixture of air and carbon dioxide was run over into the new pipette, and after suitable shaking the residual air was returned to the burette and measured.

These figures, taken at random from among the results of the class, agree with one another as well as could be expected; and since the positive derivation balances the negative, there is no constant error. No trouble was experienced as to manipulation.

LARGE POWER GAS-ENGINES.

Following our report a fortnight ago (p. 287) of the meeting of the Manchester Association of Engineers, when the possibility of large power gas-engines, or probably gas-turbines, superseding steam-engines as the motors of the future was discussed, it may be interesting to mention that Messrs. Crossley Bros. have now in hand a complete gas-engine plant of 1000-horse power, together with the gas-producers, which they are putting down at a bleach-works in Lancashire, and where it will supersede steam plant that has hitherto been in use. In the above special branch of Lancashire industry, this is quite a new departure; but it is significant of possible further developments of gas-engine plants in place of steam power. As so much has been published of late in praise of American enterprise and invention, to the detriment of English engineering work, particularly in this—that in their large power gas-engines of modern design the Americans are far ahead of makers in this country—it may be useful as a commentary upon all this to state that, notwithstanding their high protective duties, the Americans still find it to their advantage to import large power gas-engines from this country. Very conclusive evidence of this is afforded by the fact that Messrs. Crossley Bros., who previously exported a considerable number of their gas-engines to the United States, have at present in hand one 500-horse power, and eight 200-horse power gas-engines, which are being sent to America, all of them being constructed for working by producer gas.

TEST OF AN EXPANDED METAL CONCRETE SLAB.

A very interesting test was completed at Glasgow on the 20th ult., of a slab of expanded steel armoured concrete made by the New Expanded Metal Company, Limited, which was loaded on Nov. 12 last with an evenly distributed weight of 3 cwt. to the superficial foot. The slab was 7 inches in thickness, and contained a tension bond of one layer of No. 10 3-inch mesh, $\frac{1}{4}$ in. by $1\frac{3}{8}$ in. (bare), strands of expanded steel, laid horizontally, at a level sufficient to provide cover near its underside. It was composed of concrete consisting of 1 part of best portland cement, together with about $2\frac{1}{2}$ parts of brick broken to pass a $\frac{3}{4}$-inch mesh sieve, and $1\frac{1}{2}$ parts of clean, sharp sand; and it was constructed at the beginning of August. The slab had a bearing of 6 inches on all four sides; its unsupported area measuring 15 ft. by 15 ft. On examination, it was found not to have deflected at all under the load of 3 cwt. per square foot. The test to destruction was executed by the gradual application of pigs of iron carefully laid upon the unsupported area of the slab—that is to say, clear of the supporting walls—and it finally gave way under a total load of 56 tons 11 cwt., the fractures radiating from the centre to the angles of the square. The footings of the walls on which the slab was supported did not in any way subside, thus showing that the test upon the suspended slab was not influenced in any way by adverse conduct of the walls. The slab was merely a good example of an ordinary marketable floor—there being nothing extraordinary either about the materials used or its construction—and therefore any ordinary contractor could undertake and execute similar work with equally satisfactory results. Hence the breaking load (which works out at 5 cwt. per superficial foot) may be considered as reliable; and, allowing a factor of safety of four, this gives a working load of $1\frac{1}{4}$ cwt. per foot super. The test was conducted under the supervision of a Committee consisting of Mr. A. T. Walmisley, Mr. J. P. Allen, and Mr. A. H. Morton.

THE CARRON COMPANY'S HYGIENIC CONDENSING GAS-STOVES.

Those of our readers who were present on the occasion of the delivery by Professor Lewes of his third Cantor Lecture at the Society of Arts, towards the close of last year, may remember that he did not express a very high opinion of what are known as "condensing" gas-stoves. He stated that the public were "gravely informed" that the process of condensation removed all deleterious products; but, from the tenor of his observations, he seemed to have considerable doubt about it. Whatever defects there may have been in the stoves of this kind which had come under the notice of Professor Lewes, they do not appear to be possessed by the one named above, which has lately been submitted to a severe test by a member of the "Lancet" staff, and has passed through it triumphantly. An article on the subject appeared in our medical contemporary on the 24th ult.; and we take therefrom the following particulars. The writer points out that, however perfect the combustion of coal gas may be, there are always sulphur compounds to be reckoned with; and it is the removal of these which gas-stove makers have aimed at. He maintains, as the result of his experiments, that the Carron Company have succeeded in doing this; their stove not only giving a high heating efficiency on a very small consumption of gas, but yielding products of combustion which, in the main, are condensed—the liquid formed containing much of the original sulphur in the gas in the form of combined sulphuric acid—and, in addition, are made available for warming purposes. In the construction of the stove, there is placed over the gas flame or fire an exit chamber through which the gases pass and are expanded by the heat. They then travel right and left to chambers on either side of the stove. Condensation takes place, and vapour is produced. The top section of the stove is quite hot while the lower one is cold. The hottest point, and consequently the point of greatest expansion, is about half-way down the condensing chamber, between which and the burner or fire on both sides are two tubes which carry off the vapour led into them by the hot gases formed at the top of the chamber immediately over the burner.

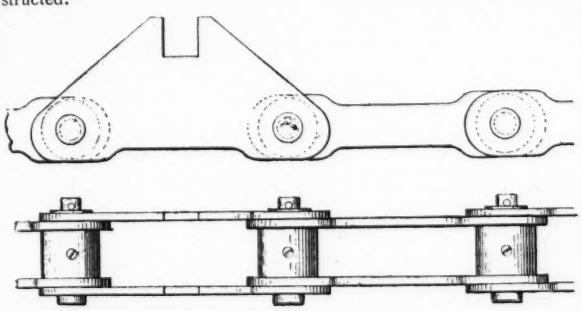
Having described the arrangement of the stove, it only remains to give the "Lancet" writer's account of its effect—viz., that a maximum amount of condensed liquid is obtained, containing a very appreciable quantity of sulphur in the form of combined sulphuric acid. In one experiment he obtained 13 oz. of fluid after the stove had been working six hours; the total gas consumed being 48 cubic feet—that is to say, approximately 1 oz. of fluid from 3 cubic feet of gas consumed. On analysis, this fluid was found to contain 7 grains per gallon of sulphuric acid (SO_3), which is equal to about 3 grains of sulphur per gallon. There was thus an important amount of sulphur washed out of the products of combustion. As to the heating efficiency of the stove, the maximum reading of a thermometer placed one foot in front of it was 80° Fahr. The stove tested consumed only 8 cubic feet

of gas per hour; and on a very cold day it sufficed to raise the temperature of a room of about 1500 cubic feet capacity, having spacious windows facing the north, from 55° to 61° Fahr. in three hours. The temperature was subsequently maintained at about 62° Fahr. for four hours, although the outside temperature fell to 48° Fahr. As might be expected, the quantity of carbonic acid gas in the air became greater; the actual increase after six hours being from 3·5 parts to 10 parts per 10,000. No attempt, however, at ventilation was made, and the increase of carbonic acid gas under the same conditions, but with people living in the room, was in much the same progression. The writer states that, even after several hours' working, there was no evidence of the presence of offensively smelling gases pointing to defects in the working condition of the stove, which gave an efficient and healthy heat, the warmed air being quite free from smell or "stuffy" character, and was not scorched.

REGISTER OF PATENTS.

Elevator and Conveyor Chains.—Gibbons, W. P. & G. B. A., of Dudley. No. 5373; March 4, 1902.

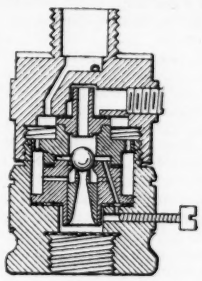
The elevator and conveyor chains described by the patentees are formed (as shown) of alternate pairs of inner and outer links jointed together by pins; some of the links (the carrying links) having the buckets or scrapers fixed to them. The invention consists "in constructing and arranging the parts so as to ensure proper working of the joints with proper lubrication; thus making them last longer in wear than is the case with elevator or conveyor chains as usually constructed."



The patentees point out that they are aware that, prior to this invention, chains have been made in which the outer pairs of links turn with the joint pins, and the inner pairs of links turn with bushes on the joint pins. What they claim is: "An elevator chain or conveyor chain formed of alternate pairs of inner and outer links jointed together – the outer links being fixed to the joint pins and the inner links being fixed to inner rollers which turn on the joint pins; the inner rollers having outer rollers revolving on them."

Regulating Devices for Gas-Burners.—Bartlett, F. G., of Bristol. No. 10,268; May 5, 1902.

This invention relating to devices for use in connection with gas-lighting burners, has for its object to control and regulate the flow of gas to pilot-lights and burners, and has special reference to the control and regulation of burners and pilot-lights in groups, sets, or series, in connection with which a bye-pass cock common to the whole installation is employed.



The construction of the appliance is shown in the engraving. When gas is passing to the pilot-lights through the bye-pass passage of the cock common to all the series, the gas enters from the barrel into the horizontal passage in which the regulating screw works. Thence it ascends in the vertical duct which meets the horizontal passage; and from this duct it passes into the annular space between the two washers interposed between the lower block and its seating. From the annular space the gas is conducted to the space between the lower and upper blocks by the passage extending from the under-face of the flange of the lower block to the top of the block. Thence the gas ascends in the gas-way central in the upper block, and flows to the pilot-light tube by way of the nipple and the port leading to the pilot-light tube. When it is desired to turn up the light—that is to say, to supply gas to the main or lighting burners—the main plug of the service bye-pass cock is turned. By the increased pressure, the valve is raised off its seats and rises to the flanged nipple, and blocks the gas-way through it. The gas is deflected to pass downwards between the valve-seats, whence it passes into the space between the outside of both blocks and the inside of the barrel. Thence the gas ascends through the ducts in the flange of the upper block and passes away to the burner through the ports in the cap leading to the nozzle which surmounts the cap.

Retort-Drawing Apparatus.—McKinlay, R., of Vauxhall, S.E. No. 10,730; May 9, 1902.

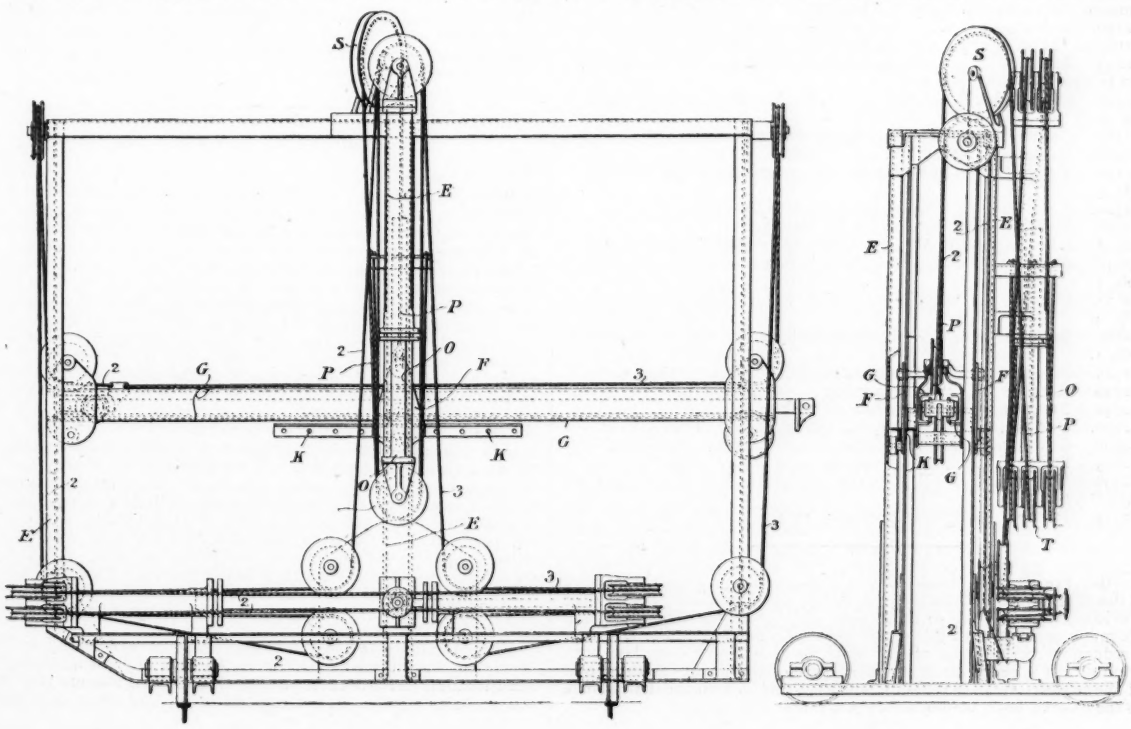
This apparatus for drawing gas-retorts comprises a beam, in (or on) which the rake is adapted to slide, mounted in a carriage between two end standards, and supported about its centre by trunnions upon a frame adapted to be lowered or raised by hydraulic or other power for bringing the beam and rake opposite to the required retort. At the rear end of the rake are attached oppositely-disposed ropes or chains, led over pulleys at the ends of the beam and pulleys at the upper ends of the end standards to hydraulic rams or other power motors; the arrangement being such that while one ram or motor pulls its rope or chain and actuates the rake, the other releases its rope and allows it to follow the rake, while the first movement in pulling the rake both in and out serves to tilt the beam upon its trunnion, and so tilt the rake.

An end view and a front elevation of the apparatus are given.

The frame of the apparatus is mounted on wheels; and there are standards or pillars at each side and one E at or about the centre of a height above that of the highest retort to be worked. Adapted to slide in or on the middle standard or pillar is a frame F, upon which a beam G is pivoted; its pivoting motion being controlled by stops inserted in graduated holes K in the frame. The rake is supported, and is reciprocated upon, the beam G; appropriate anti-friction wheels being provided to ensure easy motion.

The frame F (and with it the beam and rake) is raised and lowered by a hydraulic ram O (or other power motor) disposed vertically upon the middle standard; the chain or rope P being secured at one end to a fixed point on the frame, and passed therefrom round the pulley S on the standard, and the pulley T on the ram is then secured at its end to a fixed point on the standard E.

Two hydraulic rams (or other power motors) are located in the base



of the carriage—one for pushing the rake into the retort, and the other for withdrawing it. The former is preferably a constant-pressure ram. They are both connected so that when one ram is moving outwards it draws the other inwards.

The chains or ropes 2 and 3, for effecting the reciprocation of the rake, are oppositely arranged. The former is secured at a fixed point on the middle of the standard E, and led over a pulley on the ram and various other pulleys on the carriage standards or pulleys and beam. The other rope is secured in the middle of the standard E, and led over a pulley on the ram and then over other pulleys on the carriage standards and beam. Thus, when the rams are pushing or withdrawing the rake into or from the retort, the beam (and likewise the rake) is tilted upward or downward by the initial movement of the ropes or chains—the extent of inclination being determined by stops. That is to say, when the rope 3 commences to move, it first acts upon a pulley to tilt the beam upward at that end, and then the further movement of the rope slides the rake on the beam and pushes it into the retort. On the return movement, the first motion of the rope 2 raises a pulley, tilts the beam in the opposite direction, and then commences to withdraw the rake.

The blade of the rake is hinged so as to fold down on to its supporting rod as it is pushed into the retort, and then opens out and engages the coke as soon as the return movement takes place.

Valve Appliances for Limiting the Extent of the Shocks or Variations of Pressure Produced Intentionally in Gas Supply-Pipes for the Purpose of Igniting or Extinguishing Gas-Jets.—Shillito, T. R.; a communication from G. Goliasch and Co., of Berlin. No. 4676; Feb. 24, 1902.

In devices for igniting and extinguishing gas-jets by producing shock or variations of pressure in the gas supply-pipe, there has (the patentees point out) hitherto been the disadvantage that the excess pressure, or the depression, operates equally on all valves and burners, and the pressure between the interposed pressure devices is lost in the pipes. This "invention" consists in an arrangement of check-valves interposed in the gas supply-pipe, at suitable intervals apart, for the purpose of directing the force of the shocks or variations of pressure, produced by the pressure and suction valve, only in the desired direction to the burners, and of limiting the extent of such shocks or variations of pressure.

Test-Burner.—Grafton, W., of East Ham. No. 22,873; Oct. 21, 1902.

This invention is described elsewhere in the present issue—p. 412.

APPLICATIONS FOR LETTERS PATENT.

1856.—Dever, J. and Surmont, F., "Production of acetylene gas." Jan. 26.
1911.—Fielding, J., "Internal combustion engine." Jan. 27.
1954.—Berthold, R., "Incandescent mantles." Jan. 27.
1994.—Johns, F., "Generating producer gases." Jan. 27.
2015.—Bergman, G. E., "Incandescent burners." Jan. 28.
2019.—Craig, G., "Obtaining hydrocyanic acid from ferrocyanides." Jan. 28.
2029.—Thorp, T., "Gas-meters." Jan. 28.
2040.—Moore, A. E., and Darch, A., "Incandescent gas-lamps for railway carriages." Jan. 28.
2062.—Hooker, W., "Gas apparatus." Jan. 28.
2079.—Marks, G. C., "Rotary engines, pumps, and blowers." A communication from J. Gleave. Jan. 28.
2120.—Rowbotham, W., "Gas and like engines." Jan. 29.
2167-8.—Moeller, J., "Incandescent gas-burners." Jan. 29.
2193.—Ellis, G. B., "Atmospheric gas-burners." A communication from F. Siemens. Jan. 29.
2267.—Stacey, J. F., and Matthews, T. E., "Manufacture of gas." Jan. 30.
2283.—Gaze, W. H., "Improvements in illuminating gas." Jan. 30.
2407.—Bagley, G., "Oil and gas engines." Feb. 2.
2430.—Thorp, F., "Anti-vibrator for incandescent gas lighting." Feb. 2.
2500.—Franklin, J., "Street gas-lamps." Feb. 2.
2580.—Pradel, A., "Gas-engines." Feb. 3.
2625.—Lanchester, F. W., "Gas and oil engines." Feb. 4.
2647.—Eaves, T., "Preventing shock to incandescent gas-mantles." Feb. 4.
2678.—Haack, J., "Stocks and dies for cutting gas threads." Feb. 4.
2681.—Scott-Snell, C., "Incandescent gas or vapour burners." Feb. 4.
2715.—Martin, P. A., "Incandescent gas-burners." Feb. 5.
2726.—Ellison, H., "Tar macadam." Feb. 5.
2748.—Fielding, J., "Gas-producer." Feb. 5.
2780.—Glover, T., "Atmospheric gas-burners." Feb. 5.
2806.—Elworthy, H. S., "Production of water gas." Feb. 5.
2873.—Portmann, C., "Gas cooking-apparatus." Feb. 6.
2938.—Cheesman, G. R., "Controlling the flow of gas and oil wells." Feb. 7.
2955.—Jenkins, W., "Elevators and the like." Feb. 7.

Gas Profits at Walsall.—The profits on the past year's working of the Walsall gas undertaking amount to £5887, against £1514 in the previous twelve months, or an increase of £4373. The Gas Committee are much gratified with this result, especially in view of the fact that a reduction in the price of gas used for power purposes has been granted. It is proposed to transfer £3000 of the profits to the credit of the borough fund in relief of the rates, and to transfer the balance to the reserve fund, which will then stand at £18,031.

CORRESPONDENCE.

[We are not responsible for opinions expressed by Correspondents.]

Mr. Glasgow on the War Path.

Sir,—Owing to absence from town and the pressure of much work, I have been unable to give detailed attention to Mr. Glasgow's article in last week's issue of the "Journal."

Should a more careful perusal of Mr. Glasgow's effusion warrant me replying to his allegations, I trust that your offer of publication in the "Journal" will remain open.

C. Dellwik.

25, *Victoria Street, S.W., Feb.* 16, 1903.

Sir,—I greatly regret that the publication of an incomplete report of a series of experiments with blue water-gas at Ilford should have aroused such a clamour from the representative of the Lowe water-gas plant makers, and more especially so seeing that stress of business will not allow me at the moment to go into the question in detail or to enter into any controversy of this nature.

The figures I gave as to the cost of manufacturing blue water gas are certainly incomplete; but surely the omissions could be supplied by any person of average intelligence. Mr. Glasgow states that there are six items wanting—

(1) *Boiler Fuel*—The consumption of water is given—2840 gallons; and I suppose, with breeze as fuel at 2s. 6d. per ton, 10s. would fully cover the cost on this head, or (say) 0·25d. per 1000 cubic feet.

(2) *Purification*—At Ilford, oxide alone was used; the carbonic acid being left in the gas. The amount of sulphuretted hydrogen in our water gas is about one-fourth the quantity in the coal gas. A liberal estimate of the cost of purification would be (say) 0·25d. per 1000 cubic feet.

(3) *Wear and Tear*—In accordance with Mr. Glasgow's ideas of what should be included under this head (and I certainly do not agree with him), this item at Ilford would be not less than 4d. per 1000 cubic feet.

(4) *Proportionate Expense of Exhausting*—About 0·5d. per 1000 cubic feet.

(5) *Share of Management, Office, Yard, and Incidental Expenses*—This, in my opinion, should be stated as a *minus* quantity, as the introduction of water gas certainly reduced management, office, and yard expenses.

(6) The *extra* cost of making the test, I consider about 0·3d. per 1000 cubic feet above the cost of regular working.

Taking all the items together, and allowing 20 per cent. increase in generator coke (Mr. Glasgow's figure), the total is—

	4·00d.	per	1000 cubic feet.
Add No. 1	0·25	,,	,,
,, 2	0·25	,,	,,
,, 3	4·00	,,	,,
,, 4	0·50	,,	,,
Deduct ,, 6	−0·30	,,	,,
Total .	8·70d.	,,	,,

The *net cost of coal gas* at Ilford is not less than 2s. 2d. per 1000 cubic feet.

These are the figures Mr. Glasgow required; and I should be glad if he would supply me with what he estimates carburetted water gas would cost under similar circumstances.

J. H. Brown.

Nottingham, Feb. 14, 1903.

Photography in Gas-Works.

Sir,—I have read with considerable interest the illustrated article in your current issue upon "Engineering Works and Shop Lighting by the High-Pressure Gas System," and note with pleasure the convincing way in which the conclusions to which that article points are driven home by the photographic illustrations which accompany it.

The rapidly growing use of photography for recording events and objects of interest to the gas industry, marks distinctly a step in advance in the journalism of the profession; and the valuable application of the photographic art to the obtaining of records—the absolute authenticity of which are (or can easily be placed) beyond cavil—of the various stages in construction of new plant, &c., surely warrants the expenditure, even in small gas-works, of the moderate sums required to add a photographic outfit to what may be termed their subsidiary equipments.

I would venture, however, to draw, through the medium of your columns, the attention of photographers of subjects including sources of light shown in strong contrast to darker objects—such as are afforded by interiors of buildings artificially lit, or where the photograph includes a window which is the main source of light—to the great gain in distinctness obtained by the use of "backed" plates or of films for the production of the negatives. This gain is very markedly seen when comparing the second and third with the fourth and fifth illustrations in the article to which I have referred. The blurring to be noticed in the latter two—known to photographers as "halation"—and its detrimental effect may also be seen in the first photograph on p. 352.

Stated briefly, it is due almost entirely to the reflection by the glass of the negative plate of certain of the rays of light falling upon the sensitive film, which in their passage through this film are scattered by the particles of silver salt contained in it; and when, as is the case,

the defect can be avoided at the negligable cost involved in the use of a backed plate or a film, surely it is worth doing. W. W. TOPLEY.

Croydon, Feb. 11, 1903.

[It may be remembered that in the "JOURNAL" for the 27th ult. (p. 214) we took an opportunity of urging the desirability of gas engineers providing themselves with cameras for use in securing records of work done, &c.—ED. J.G.L.]

Blue Water Gas at Ilford—and Elsewhere.

SIR,—With reference to the article from Mr. A. G. Glasgow in your issue of the 10th inst., it appears that the whole question comes under two heads—

(*a*) Relative efficiencies of the Lowe and the Dellwik systems for the production of "blue" gas only.

(*b*) Relative costs of same.

While it would appear from the article under review that Mr. Glasgow claims for the Lowe system equal efficiency—at least—for the manufacture of "blue" gas, he has not adduced any figures of the work of the plant he champions adapted to such a purpose; and until this has been done, it seems futile referring to thermal efficiencies which are somewhat of academical interest to the practical user of a plant—its worth being rather rated upon the value of the raw materials consumed for a given finished return.

Surely it would not be difficult for Mr. Glasgow to run a Lowe plant for the production of "blue" gas only, and publish the results of same, with full details of the conditions under which they were obtained. Comparison would then be possible, seeing that particulars are published already, both for here and for the Continent, relating to the other system.

It certainly seems logical to expect that a plant designed for one set of conditions would require alteration before its performance was perfect under another set. However, it would be to the interest of all, and the shortest way, to put the plant in question under test, so that the claims advanced in its behalf might be compared with those of its opponent. CALIFACCION.

Feb. 12, 1903.

Wanted—A New Form of Gas-Stove.

SIR,—Might I suggest to stove makers a new form of stove to meet the requirements of the lower middle and working classes? From motives of economy, many people avoid as far as possible the use of two simultaneous fires; and in winter the coal-fire is utilized also for cooking purposes, though the advantages of a gas-cooker may be neither unrealized nor unappreciated. I therefore think a very desirable addition to gas appliances would be a stove on the plan of the kitchen-range, having (say) a ball-fire with a flue encircling an oven before passing to the chimney. The oven should be of dimensions comparable with those of ordinary roasting-stoves, and not merely a griller or toaster. Boiling should also be provided for, if necessary, by separate rings; but the heat of the ball-fire should be utilized as far as possible for cooking purposes. The whole thing, in fact, should aim at supplanting the kitchen coal-fire of the classes named.

Of course, there are difficulties of construction and of cost—a high rental being prohibitive. But such a stove would render considerable assistance to gas in becoming "the fuel of the future;" and as gas companies are so nearly concerned, they would doubtless co-operate with the makers as regards the latter difficulty. Moreover, little need be spent on decoration. The work of designing and constructing such a stove I commend to the ingenuity of the makers, and the whole suggestion to their enterprise. A. CLEVERLY.

182, *Brecknock Road, N., Feb.* 12, 1903.

The Upkeep of Incandescent Burners.

SIR,—On p. 83 of your issue for Jan. 13, there is a paragraph regarding the manner of making repairs to incandescent gas-lights in Berlin; and perhaps our experience would be of interest to your readers.

The Welsbach light was introduced in this city by us ten years ago; and from the beginning, our efforts have always been to develop what we term our rental system. Our system consists in supplying customers with complete lights on a yearly rental, varying according to the location of the lights, from 75 c. to $1·50 each per year. The lights remain our property; and during the continuance of the contract we supply all repairs of mantles and chimneys (without restriction) needed to give the customer a satisfactory light, together with any necessary inspection services.

This rental plan has been well received, and continues to be our principal local business in this city, although complete lights are being sold by ourselves and our competitors as low as 35 c. each. It should be stated, however, that the quality of these 35 c. lights is in proportion to their price.

We have never used, in our repair service, mantles which have been collodionized—not, however, because the light-giving value of the mantle is perceptibly affected by the process, but because we are convinced that the burning-off of the collodion severely weakens the structure of the mantle. We know of the experience of other cities on this Continent where the rental service has been attempted with collodionized mantles; and the almost universal result is that a light used under good average conditions will require five or more collodionized mantles every year to keep it in running order. Our annual average repairs on over 40,000 lights operated under our rental system have never exceeded two-and-a-half uncollodionized mantles per year per light.

Our repairs, of course, are made by our own staff of men; and the mantles, after being tempered in our own factory, are mounted on clean burner-heads or galleries (as we call them), and are then carried in an ordinary telescope bag by the fitter in making his rounds. The fitter brings back the burner-heads or galleries which have been replaced by new ones with new mantles; and these old ones are then repaired (if necessary), cleaned up, relacquered, fitted with new gauzes, and are then ready to be fitted with new mantles in the factory, and be used again. In this way, the brass-work in customers' premises is always fresh and clean.

The mantles broken by the fitter in covering his route average less than 1 per cent. of the quantity handled, or considerably less than the breakage occasioned in adjusting and burning off collodionized mantles. The actual time required to make a repair under our system is less than would be necessary to adjust a collodionized mantle.

W. R. GRANGER,
General Manager, Auer Incandescent Light Mfg. Co.

Montreal, Canada, Jan. 29, 1903.

Parliamentary Agents and Commissions.

SIR,—There is no foundation for the statement on p. 339 of your last issue, that the Association of Municipal Corporations was instituted by a firm of Parliamentary Agents. The Association was established in pursuance of a resolution passed at a numerously attended meeting at the Westminster Palace Hotel on the 23rd of February, 1873, at which nearly all the large towns of England were represented, besides upwards of fifty Members of Parliament.

We believe the gentlemen chiefly responsible for the formation of the Association were Sir Joseph Heron, the Town Clerk of Manchester, Mr. Rayner, the Town Clerk of Liverpool, Mr. Hayes, the Town Clerk of Birmingham, and Sir Samuel Johnson, the Town Clerk of Nottingham. In the early years of the Association, Mr. Joseph Chamberlain, M.P., while Mayor of Birmingham, took a leading part in the proceedings, and frequently occupied the chair. Our connection with the Association did not commence till the year 1879.

We do not know whether the other questions mentioned in your article were intended to apply to us; but in any case we do not intend to discuss them. Our friends and clients know very well that we are incapable of making any improper or unprofessional arrangements as to our remuneration.

SHARPE, PARKER, PRITCHARDS, BARHAM, and LAWFORD.

9, *Bridge Street, Westminster, S.W., Feb.* 12, 1903.

SIR,—In your "Editorial Notes," under the above heading, in the last number of the "JOURNAL," you refer to the practice, which no doubt prevails in certain cases, of Parliamentary Agents allowing commissions to Clerks of Local Authorities who bring them business; and you say that this state of things "needs the application of an immediate remedial and deterrent measure." Let me point one out. In cases where clerks, in addition to what they are legally entitled to from their position, receive commissions from Parliamentary Agents, if the ratepayers would proceed against them for the purpose of having such commission applied to the reduction of the rates, I think there is little doubt they would be successful.

The other point you refer to, with regard to Parliamentary Agents sometimes receiving discounts on printers accounts, &c., stands on a totally different footing; and I venture to think the system has nothing "immoral" about it. A Parliamentary Agent employing a printer has, in order to obtain any discount, to pay that printer promptly—often long before his own account is paid; and his liability to the printer is not dependent upon his receiving payment. P. A.

Feb. 13, 1903.

[The above letters are referred to elsewhere, p. 405.—ED. J.G.L.]

LEGAL INTELLIGENCE.

Alleged Falsification of Accounts at Cheltenham.

At the Cheltenham Police Court, on Monday of last week, Edwin C. Jennings, a clerk in the employ of the Corporation, was charged with omitting to enter the receipt of £40 12s. 9d. in the cash-book provided for the purpose. The proceedings were taken as the result of investigations into the accounts of the Water Department. It was stated that a deficiency of £250 had so far been ascertained, which was directly traceable to the prisoner. The accused was remanded for a week, without bail, in order that further search might be made through the books.

Charging for Unused Electric Current.

At the Lambeth County Court last Tuesday, before his Honour Judge Emden, the South London Electric Supply Corporation, Limited, sued Mrs. Elizabeth Handford, a widow carrying on business at Tulse Hill, to recover 13s. for electricity supplied and meter-rent. Defendant deposed that when she went into possession of her shop, the electric light fittings were there; but she always used gas, as it was cheaper. An electric light inspector came round, and witness informed him that she did not want the light. She signed a paper which he represented was to the effect that she would not use the electricity; and it was only immediately before the receipt of the summons that she learned it was an electric light agreement. Judge Emden said a very serious allegation had been made—not the first against the Corporation in that Court; and he adjourned the case for the inspector's attendance. Subsequently the representative of the Corporation said the inspector was out on duty, and could not be found. Defendant swore that she never used the electric light, and repeatedly asked the Corporation to remove the meter. Judgment was entered for defendant with costs.

MISCELLANEOUS NEWS.

SOUTH METROPOLITAN GAS COMPANY.

The Ordinary Half-Yearly General Meeting of this Company was held last Wednesday, at the City Terminus Hotel, Cannon Street, E.C —Sir GEORGE LIVESEY in the chair.

The SECRETARY (Mr. Frank Bush) having read the notice convening the meeting, and also the minutes of the last half-yearly meeting, the seal of the Company was affixed to the register of proprietors, and the report of the Directors, with the accounts for the six months ending December 31 last, already given in the "JOURNAL" (*ante*, p. 297), was taken as read.

The CHAIRMAN: Ladies and gentlemen, it is my duty to move—"That the report and accounts now presented be received and adopted, and the report entered on the minutes." I do not know that there is very much to say on this occasion, because everything seems to be going well; but I might perhaps refer to one or two items in the accounts. The first one to which I would draw your attention is the question of capital. That is perhaps the most important—permanently the most important. Of course, for the time being, the revenue, which governs the dividend, is the most important; but if our capital is increasing at too great a ratio, there must be trouble for us in future. Now, you will see by the capital account (No. 3) that in the half year we added £75,000. We have spent £75,000 on capital account; £25,000 of it being for new buildings and machinery and for the extension of works. The whole of the latter sum has been expended at our East Greenwich station, on absolutely new works. We are building there a fifth gas-works. We have already four, and this will be the fifth complete works. The remainder of the £75,000—say, roughly, £50,000—has all been expended on the district. Of this amount, £21,800 has been spent on new and additional mains and services to meet the greater demand for gas, £17,165 on new and additional meters, and £10,900 on new and additional stoves; or altogether £50,000. Now, the whole of this has been expended in adding practically new consumers. If I compare the number of consumers with a year ago, I find that we had 232,000 a year ago, and now we have 249,000—an increase of 17,000 in the twelve months. Of this, a large proportion consists, of course, of slot-meter consumers. Last year we had 123,000 of these consumers, and we have now 139,000; so that 16,000 out of the 17,000 increase consists of these consumers. Of course, having in nearly all these cases to provide a stove as well as a meter and service-pipe, accounts for the greater part of this expenditure on capital account. But these small consumers pay; if they did not, it would be very bad business. We are authorized to make an extra inclusive charge not exceeding 10d. per 1000 cubic feet for gas supplied in this way. This is to pay for interest on the outlay, for maintenance and rent of meters, rent of stoves, and rent of fittings. In the ordinary case, the consumer provides his own stove—or, at any rate, we provide it, and charge him a rent; he provides his own fittings, and we provide a meter and charge him a rent. But with the slot meter we do not make the rent separate—it is an inclusive charge; and the London County Council some years ago got a Bill passed prohibiting the charge being more than 10d. per 1000 cubic feet. In our case, the charge is 9d. per 1000 cubic feet extra; and that, as I say, pays us. It does not do more than pay us; but it seems to me to be a fair charge. Then another test as to capital is to be found in the amount required per 1000 cubic feet to supply gas. Taking the whole of the gas made last year and the total capital to the end of the year, I find that the capital amounts to 8s. 3d. per 1000 cubic feet, or £4, or perhaps a trifle more, per ton of coal, which is certainly a low figure. I do not know that there is much else to refer to in the accounts; but it is a singular thing that, taking the last three half years, the cost of coal last December was 12s. 2¾d. per ton. Last June it was 12s. 5½d.; and for the December half of 1901 it was 12s. 10¾d. So that we get our coal at 8d. per ton less. That is not much. It is largely due to the reduction in freight. Now that I am on the subject of coal, I may refer to a paragraph in the report which deals with this question. The high price of coal is one of the most serious factors with which gas companies and gas undertakings have to contend. We used to get coal at 6s. per ton free on board. Then it got up to 7s., and we did not complain much about that. Then it went to 8s.; and three years ago it went to 16s. Then two years ago it came down to 9s.; and last year we renewed our contracts at the same price of 8s. 9d. to 9s. per ton. This accounts for the singular uniformity in the cost of coal in the three half years—on the average it was rather less than 9s.; the best coal we got at 9s. It was a disappointment to us last spring when we came to renew our contracts that we got no reduction; but the facts were these: In the winter of 1901, there was a large demand for coal; and the coal which we bought in the spring of that year at 8s. 9d. and 9s. a ton went up to 12s. The price through the winter of 1901 was 12s. a ton for the lots that had to be sold otherwise than by contract. Well, that being so, the coalowners succeeded in making us pay the same price in 1902 as we had paid in 1901; but things were rather different last winter. Instead of coal going up to 12s. for odd cargoes or odd lots outside contracts, as it did a year ago, this winter it has not gone above 10s. And there is another fact: The gas companies have had no difficulty whatever in getting coal. The deliveries have been maintained without any trouble. No pressure has been put upon the coalowners; and this we take as conclusive evidence that the supply is equal to the demand. Under these circumstances, I think we have a prospect of getting coal somewhat lower this year. I do not expect it will go down to the old price of 7s. per ton; but I certainly do expect it will go something below the 8s. 9d. and 9s. which we paid last year. If it does so, it will tend to the benefit of the consumers directly and to the benefit of the shareholders, because, with the cheaper coal, we shall be able to sell gas cheaper, and we shall be entitled to pay a higher dividend. Mentioning the better dividend, brings me to another question—and this, I suppose, after all, is the question of most importance and interest to all of us here. The second paragraph in the report tells you that we recommend a dividend of 5⅛ per cent., or £5 6s. 8d. Now, this is the full dividend that we are allowed to pay under the sliding-scale. Generally speaking, the shareholders of this Company for a number of years past have exercised a great amount of self-denial, and have been willing to forego dividend in order to restore the reserve fund to a figure that is satisfactory. We had a reserve fund of well over £200,000—in fact, nearly £250,000. This was absorbed, partly to pay for the strike, but mainly to enable us to avoid increasing the price of gas in 1890-1. The high price of coal lasted so long that we were obliged to increase the price of gas after all, when our reserve fund had all but gone—in fact, in December, 1891, it had got down to under £40,000. Now, since that time the shareholders have been foregoing dividend. They have foregone in these ten years something like £100,000 of dividend, which has gone to restore the reserve fund to a figure which I think we may consider satisfactory. It now stands at £150,717. We have increased our insurance fund also, which was depleted by the strike, and was reduced to £10,000. We have increased it to £72,000; and we have an undivided balance of £11,000, or something like £234,000 in all in the shape of reserve. Well, under these circumstances, I think we are perfectly entitled to all the dividend we are allowed to divide. It is not an excessive rate of interest that you get on your investment. You do not get £5 6s. 8d. per cent., for if you had to buy stock in the market you would have to pay such a price as would yield you something less than 4½ per cent.; and all our stock being sold and issued at the market price, this is all the interest that the consumer is called upon to pay for the new capital brought into the business. It is a satisfaction, at all events, to feel that this dividend of £5 6s. 8d. is as high as we have ever paid. After 1889, we reduced the dividend, partly to pay for the strike, to 5 per cent.—equivalent to 5 per cent. on the converted stock. Then it stood for six years at £5 4s.; then it went to £5 5s.—5¼ per cent. For two half years we paid £5 6s. 8d., and we got down to 5 per cent. in 1898; and now we are up again to £5 6s. 8d., which is the high-water mark of dividend that the Company have ever paid. It is the highest we have paid; but I hope some day we shall get beyond it. Certainly, with our reserve fund in its present satisfactory position, I see no reason why we should not divide up to the hilt, which we propose to do on this occasion. I do not know that there is very much else I need refer to in regard to these matters; but there is one item in the report, or one set of figures in the report, which I think will be of interest, and that is about incandescent lighting. We are doing all we can to help consumers to take advantage of this greatly improved system of lighting; we have a large number of men engaged in doing nothing else but attending to their mantles and keeping them in order. But the point I wished to mention to-day was about our public lighting. Now, we hear a great deal of foreign cities; and I have heard it suggested that we English people should pay a visit to Berlin in order to see how incandescent gas lighting can be carried out in the public streets. Well, there is no need to go so far as Berlin. If you cross the river, going to that benighted district known as South London, you will find as good a piece of public lighting by the incandescent system as you will find in Berlin—with this difference: In Berlin I have no doubt they are more liberal as to the number of lamps; but as to the efficiency of lighting, I can say from this chair that it cannot be better than is maintained in South London. We have about 22,000 public lamps; and of these, about 18,000 have been fitted on the incandescent system. It is four years since we made a proposal to the various parishes, as they were then, that we would undertake the immediate cost of the change from the common flat-flame system to the incandescent. It would, we said, cost so much per lamp—perhaps something approaching £1—but we said to them: "If the gas lighting is to be altered to the incandescent system, much less gas will be used, and you will get a much greater quantity of light. We shall be able to supply the lamps at so much less per annum. If you will agree to pay the old rate for two or three years, we will make the change in the gas-lamps; and the cost of it shall be recouped out of the difference between the old gas consumption and the new." Well, I am happy to say that this has been carried out to the extent of 18,000 out of 22,000 lamps, and, I think, with great satisfaction to the parishes and boroughs that have adopted it. I must say a word here of compliment to our Engineer, Mr. Carpenter, for the manner in which he has carried out the work, and to the man who is employed especially to look after the incandescent lighting. He is the grandson of an old stoker whom I knew when I was a boy, a man named Keeler, who looks after this lighting; and he, together with the lamplighters—for credit is due to them also—is maintaining the lamps in South London in a way that is a credit to everybody concerned, and a satisfaction to all who have to see them. Mr. Bush tells me that this work costs us a great deal of money; and I may say that we went even further than we promised. We told these people that we would incur this cost, to be repaid as stated; but, in order to do the thing properly in certain particulars, we went beyond that—for instance, in the substitution of a handsome column of our own design for the old-fashioned octagon column that was in use. We have put up these new columns—which we call the "Eddystone" columns—in all the main streets in South London, at the Company's expense; and this has entailed considerable cost on us. But we have done this: We have secured the public lighting, except in three or four parishes that were committed to electricity. I never mentioned electric lighting from this chair until the last meeting. I have nothing to say against the electric light. It would be folly and stupidity, and I should be an idiot if I were to indulge in any expressions detrimental to the light. The electric light companies have just as much right to live as we have; and if we cannot hold our own, we must go under. If there is a better system than ours, and we cannot maintain our position, there can be only one result. But we are holding our own. The objection I have to electric lighting, however, is when it is in the hands of the municipalities. I got into hot water last time by referring to this; but I must refer to it again. There are three or four of the parishes in South London that were committed to electric lighting;

and the following happened in one of them quite recently: There was a question of the extension of the electric light to 23 streets. The Surveyor of the borough had reported as to the cost per candle per year for gas lighting, that it could be done for 7½d. The cost of the electric light for the arc lamps up to midnight, and those two wretched incandescent things one on each side of the post after midnight, would cost something like 1s. 8d.—or about three times as much as gas, on the Surveyor's own estimate, light for light. But there was more than this. To fit up the light in these 23 streets, some couple of hundred gas-lamps would have to be displaced; and to instal the electric light entailed a cost of upwards of £4000 upon the Borough Council. The Company sent them a proposal to light these streets, as the borough had not adopted the incandescent system; but they were committed to the electric light, and they stuck to the old flat-flame burners. We made them the offer that we would undertake the alteration and renewal and would supply these 23 streets with incandescent lighting at—I forget the figure, but at a very low price. It was brought before the Borough Council. One gentleman said: "We have spent so much money on this business that we must go on." It was as though he had said: "We are doing so much business at a loss, that if we increase it, the more we increase the business at a loss the greater our profit will be"—like the old apple woman, who said she made a loss on every apple she sold, but it was only the quantity out of which she got her profit. (Laughter.) However, this gentleman said: "We have incurred so much expense in this electric lighting business, that we must go on." They resolved to spend over £4000 on the alteration, which is to be charged to capital. This is to be a debt upon the borough; and the cost of lighting, when they had done all this, would be about three times as much as the cost of gas. However, they will find it out some day; and the ratepayers, I dare say, will stop it. In another case I mentioned last time—Reigate—I got into hot water by referring to the town, and saying there was a considerable loss on the electric lighting which was charged on the rates. I was called to account by the Mayor of that day, and asked to repudiate what I had said. I said to him: "Give me the figures. I have only got my information from public sources—the reports in the local papers of the meeting of the Borough Council. Give me the figures, and if I have made a mistake I will do my best to correct it." "Oh, no," he said; "I am not going to give you figures. I have hitherto regarded you as a Christian and an honest man; but I can regard you as neither now." (Laughter.) Since then this gentleman has been made Chairman of the Electric Lighting Committee. Well, it is right that he should have to nurse his own baby; but he takes very great care not to give any information to the ratepayers of Reigate. I have closely watched the reports of the Council; and I have one in which he says: "Next year I expect the receipts from electric lighting will be more;" but he will not say a word as to what they were last year. But this came out—that the borough only supply 186 customers. I do not know how many ratepayers there are in Reigate, but certainly more than 4000, and these 186 would be less than 5 per cent. of the total. Therefore these customers have the electric light at considerably under cost price, and the remainder—the other 95 per cent. of the ratepayers—have to make up the loss. Now, that sort of electric lighting and that sort of trading I object to. I really do not know that there is much else to say, except with regard to the position of the Company. I think you would like to have some assurance on that point, seeing what strong competitors we have. In the old days, gas was an absolute monopoly. We had a district to ourselves; there was no competitive light. But now we have on the one side mineral oil, which we have beaten with the slot meter, and on the other the electric light; and we have beaten that by the incandescent mantle. We are able to give better value for money in both those cases than our competitors. But there is no doubt whatever that we are subject to very great and severe competition. Now, what has been the effect on the Company? I take the accounts of the gas sold in the half year ending December, 1892—just ten years ago—and compare them with the gas sold in the December half of 1902, and I find that we have an increase of 68 per cent. in the ten years; that is to say, in the December half of 1902 the gas sold was 68 per cent. more than it was ten years previously. Well, ladies and gentlemen, that, I think, will give you pretty good assurance that gas is holding its own. Then there is one other point I must refer to. I should like to draw special attention to the paragraph in the report which speaks of the consumers being really partners with the Company. We are, so to speak, the active partners—we are engaged in doing the work; but we are acting quite as much for the consumer as for the shareholder. The sliding-scale, when properly worked and allowed to have its legitimate effect, does bring about this partnership. You know what it is. If we reduce the price 1d. per 1000 cubic feet, we give to the consumers £48,000 a year; and then, after we have given the consumer this £48,000 a year, we are allowed to increase our dividend by just £8000—it comes to just £8000 on the capital. On the other hand, if we raise the price 1d., which takes from the consumer £48,000, it necessarily follows that we must lose £8000 of dividend. It is a self-acting arrangement—an arrangement which I think is of great advantage to both sides. Now, there is another question in regard to our consumers. I am telling you about the position of the Company; but there is another element in that position. If we had no friends among our consumers—if they were angry with us, if they were our enemies, if they were bitter against us—it would be a very different matter. But I think—well, I am in a "Fool's Paradise" if I am not right—I think we have the good-will of our consumers. I make it my business to inquire from time to time from the officers of the Company what is the feeling of the consumers. I am told that this feeling is one of downright friendliness to the Company. This morning, I asked for all the letters of complaint that had been received to-day. You can easily understand that, with a quarter-of-a-million customers, a quarter-of-a-million meters, a quarter-of-a-million service-pipes, something like 150,000 gas-stoves and cooking-stoves, besides fires, and 139,000 houses that we have supplied with fittings (we have to look after the burners and everything else in these houses), something will go wrong every day. Well, I had all the complaints that were received this morning; and they numbered 80. Last week they numbered about 580—averaging, at this rate, one complaint per consumer in eight years. I read them all—every one of the 80—and there is not one of them that is expressed otherwise than in really friendly terms This, I think, is very good evidence that we have a large number of friends among our consumers. There is only one other remark I have to make, and that is about our employees. One of the great difficulties of this large business is to avoid cast-iron rules so as not to bear hardly on people, and to keep clear of "red tape." I think I may say that the one consideration of our officers is to do the best they can for the consumers. I say that not only of the chief officers—Mr. Carpenter and Mr. Bush—of whom I cannot speak too highly, but of those who are working under them. The same spirit animates them; and I think I may say the same spirit animates all, right down to the workmen—viz., a desire to do what they can to help to make things go smoothly. Now, with reference to our workmen and employees generally, there is this extraordinary state of things—that they hold now in the Company something like £170,000, or an average of £40 per man. Of course, a large proportion of them have not very much. The average holding of the thriftless is perhaps something like £10 a head; but this only means that the others have a great deal more. There are hundreds of workmen in the employment of the Company—and some of them are here to-day—who have the right to be here as shareholders; and there are hundreds who will tell you that they could save nothing before we instituted this system, and are now owners of £100 and more. Well, that is not a small thing for them. That is where it has benefited them. But where has it benefited us? One of the commonest things one hears of—one sees it in the papers and hears it everywhere—is as to the labour difficulties; and people are ready to accept anything that will dispense with labour. Now, what is our position? I can tell you this (I am not accustomed here to say what I cannot substantiate or what is not the absolute fact, the absolute truth) that in numbers of cases—in the majority of cases, I think it might be said—if a hundred men, say, are employed on a certain work, and if by the adoption of machinery fifty of them could be displaced, nearly all employers would say: "Let us adopt the machinery and get rid of the men." That is not what we say. We say this—I was asking Mr. Carpenter as I came up here, and I am sure it is true—that, supposing such a case as that, by the adoption of machinery in a certain work, we could dispense with half the men, supposing there were no other advantage in it (and it is for the reduction of labour that most people like machinery), supposing the work were not done cheaper, and there were no other advantage than the displacing of the men, we would all say: "Let us not take the machinery, but keep the men." We would rather give employment to a thousand men than to a hundred; and that, I may tell you, is one of the outcomes of our profit-sharing shareholding system, and it is an untold advantage to the Company which cannot perhaps be put into money, but is of very great money value. With these remarks, I have great pleasure in moving the adoption of the report.

Mr. JOHN EWART: Mr. Chairman, ladies, and gentlemen, it is said that "happy is the country that has no history;" but you are aware that the South Metropolitan Gas Company has a long and honourable and vigorous history. At the present moment, there is something of a lull in our affairs; but I believe it is only preparatory to our going forward on the same lines that have led to the great prosperity and success shown in the balance-sheet and report before you, which is in a great measure due to the point referred to in the fifth paragraph of the report—the combination of the interests of shareholders, consumers, and employees. I have great pleasure in seconding the adoption of the report and accounts.

Mr. HOGARTH drew attention to the item of rates and taxes, which, he observed, he had seen growing from year to year, and which now approached something like £75,000 a year. The figure seemed to him gigantic and altogether out of proportion in comparison with what he was conversant with in the case of several of the large railway companies running south of London. It might be that the Board already had a Committee which kept this matter of the assessment under observation; but if it were not so, might he suggest, with all modesty, that some idea of the sort should be adopted, and that one or two of the large shareholders should be called in with a view to seeing if something could be done in the way of reducing this enormous burden? He also wished to refer to the paragraph in the report which dealt with the investments of the employees in the Company's stock. He agreed that the state of things indicated left nothing to be desired; and it proved beyond all doubt that the mind of their Chairman, who originated this profit-sharing scheme, was a master mind. He could not but feel, also, that there must have been cordial co-operation on the part of the other Directors in arriving at this splendid result.

Dr. DRYSDALE asked how much gas was obtained per ton of coal.

The CHAIRMAN: I will answer Dr. Drysdale first. We have been improving in the matter of coal carbonization. A year ago we obtained just under 10,000 cubic feet per ton; while this last half year we have made 10,578 cubic feet per ton. Now that we have got free from the question of enrichment, we are at liberty to do the best we can in the manufacture of gas. It was 10,578 cubic feet per ton on the average of the half year; but it will be better than that. We are gradually getting up. In reply to Mr. Hogarth, this question of rates and taxes has caused us great anxiety—in fact, it has been a struggle and fight with the authorities for twenty years. Ever since the amalgamation in 1880, at every quinquennial revaluation we have had a struggle with the authorities; and on the last occasion, in 1900, we succeeded in getting them all down to one uniform basis. It is a constant effort on the part of the Board to-day to do what they can in this matter; and I think I may tell you that, though our rates are very high, the comparison with the railways is perhaps subject to this criticism—that the railway companies do not pay such high dividends as we do. Theirs is a lower rate of profit; and as rating is based on the profits, they have been enabled to get the assessment lower. We have here the accounts of the Gas Companies in the Metropolis and Suburbs for the year 1901; those for 1902 are not yet out. The rates of the South Metropolitan Company come to 1·38d. per 1000 cubic feet sold. Out of the fifteen Companies in the Metropolis and Suburbs, there are only two that are lower than this—the Crystal Palace District, our neighbours, 1·31d. per 1000 cubic

feet, and the Wandsworth and Putney Company, 1·2d. This is the lowest of any of the rating. Ours is not very much higher. As to the highest, there is one 3·86d.—nearly 4d.—another 3·1d., and a good many of them are about 2d. per 1000 cubic feet. In other words, 2d. per 1000 cubic feet on the price of gas is accounted for by the rates. In our case, it is less than 1⅛d.; and I may say I think we may do better on the next occasion. At any rate, we shall do our best; we shall try. We got over the last quinquennium without a fight. We have generally gone to the Sessions, because we have refused to allow this heavy rating to pass without a strong effort to keep it down.

The resolution was then carried unanimously.

The DEPUTY-CHAIRMAN (Mr. John Mews) next moved that a dividend at the rate of 5⅛ per cent. per annum be declared. He said they had heard from the Chairman the reasons why the Directors were proposing a dividend at the full rate; and they might be perfectly certain it had been properly earned in the half year. Not only so, but they were carrying forward something over £11,000 to the next account.

Mr. AUSTIN said it was his privilege to second the resolution; and he did so with some degree of pleasure, being one of the employees who had assisted in creating the dividend, who had assisted in the distribution, and who would receive some of it.

The resolution was carried unanimously.

The DEPUTY-CHAIRMAN: It is now my pleasing duty to move the re-election of our Chairman, Sir George Livesey. It is customary at meetings of the Company to always put up each Director by himself. Now, may I ask what are the qualifications which a gentleman requires in order to be a useful member of the Board of this Company. First of all, I should say great knowledge of gas engineering. Then—and almost more important than the first—I think that he should know thoroughly well how to manage men, and I do not mean by "men" only the actual working men, but everybody connected with the Company who are men. Then there are markets that have to be watched; and decisions have to be arrived at as to when is the best time to buy or sell. If you refer to your balance-sheet, you will see that coals during this half year have cost £326,000—a large sum. This item of expenditure depends a great deal upon the buying, whether you buy at the right time or not; and the same with regard to selling residual products, which brought in £245,000 last half year. This is a large sum; but we might have made it less perhaps if we had not exercised proper care in choosing our time. Then another point; there is the financial side of the question, too. Last half year, if you will look at the balance-sheet, you will find that £75,000 has been added to the capital of the Company. Therefore it is also an important thing that we should consider what is the right time, and what is the right way, to raise such sums as are required. These are the qualifications of a director of a gas company, and more particularly of the chairman of a gas company; and I say, without fear of contradiction, that our Chairman possesses all of them. With regard to gas engineering, we all know that he is second to none—that he has for many many years past held this position, and still holds it to-day. With regard to the management of men, I consider that really, when the history of his life shall have been written, we shall find that the most important thing our Chairman has had to do has been the management of men. If I may prophesy, I should say that is the point which people will fix upon as being the point of the Chairman's powers which has been carried out to the full. He has been a great success in the welding of capital and labour. He has created agreement between apparently opposing forces. He has cemented firmly the bonds of sympathy between employer and employed. It seems to me, so far as this Company are concerned, that capital has had its proper return for the risk that has been run in the trading; while, on the other hand, labour has received a reward by way of wages proportionate to the care and skill which have been exercised in the performance of the work. I have therefore very much pleasure in proposing that Sir George Livesey be re-elected a Director.

Mr. H. HOUNSOM said he had the greatest pleasure in seconding the motion. The very last thing he supposed that the audience—and he was extremely glad to see so many present—would require was a speech, especially after the words that had fallen from the Deputy-Chairman; but he took a somewhat broader view, if he might be allowed to say so, in seconding the motion. Not only were the Company indebted to Sir George Livesey, but generally they were indebted to him with regard to company work for "setting the pace." He did not forget the words that had fallen from the chair with regard to his conception of directors and what they ought to be, and the interest that had been focussed on certain Boards lately—and rightly focussed—was promoting a thought in the minds of a great many that would ultimately produce good results in bringing about a better state of things in regard to boards generally. Here they had an ideal Board. There were boards that were not ideal; and he believed that the words that had fallen from their Chairman had led people to give their attention to this matter, and to view the action of boards of directors in a different light from that in which they had regarded it in the past. In future, he believed they would see men occupying the position of directors, not merely for the sake of ornament, but as practical business men—responsible to the shareholders, responsible to the public, and responsible to the employees, knowing their responsibilities, and endeavouring faithfully to carry out the great trust reposed in them.

The resolution was carried, amid applause.

The CHAIRMAN: I am not going to inflict upon you another speech; but I will simply offer you my warmest and most sincere thanks for the kindness with which you have again treated me on this occasion. But what other could there be, with such a lot of people as I have to do with? How can I be other than I am, with a Board of Directors who are thoroughly loyal and thoroughly devoted to one interest and, as Mr. Hogarth said, are all working heartily together? With a body of shareholders such as we have, I should be the most ungrateful man in the world if I had not a very warm feeling indeed towards all of you. I thank you very heartily. I have now to propose that Mr. H. E. Cardwell be re-elected a Director. Mr. Cardwell is not here to-day; he is unwell. But I must say this - that there is no man on the Board who is more respected and liked than our friend Mr. Cardwell; and I have very great pleasure, therefore, in moving his re-election. He is an exceedingly useful Director, and has done good service, and will do in the future, I am sure.

Dr. DRYSDALE seconded the motion, which was carrried unanimously; and thereafter Mr. Charles Mortimer was re-elected Auditor.

Dr. DRYSDALE asked that a vote of thanks to the Directors should be passed.

The CHAIRMAN: I thank you very sincerely, for myself and for my colleagues, for this renewed expression of your confidence in us. There is just one other thing. It is always usual here—and it must not go undone—to pass a vote of thanks to our officers and employees generally. You want co-operation. When all the Directors are working together with their chief officers, they must also have the co-operation of their employees, if the Company are to be really prosperous. This vote of thanks is due to all our officers and workmen—and not merely to the two chief officers, Mr. Carpenter and Mr. Bush—to the Engineers of the various stations under Mr. Carpenter, and the foremen, for a great deal depends upon them; and with regard to Mr. Bush on the clerical side, and his staff, we owe a debt of gratitude to them for working together as they do.

Mr. SIMPSON ROSTRON: It gives me the greatest pleasure to second the resolution.

Mr. CHARLES CARPENTER: It is with more than usual pleasure that I rise to thank you on behalf of the engineering staff for your kind vote. In a matter so complex, it would be out of place to individualize; but there are two departments to which I should like to make special reference, as they have been mentioned to-day. One is the carbonizing. You know how much the success of the Company depends on the carbonizing; and I am very glad to say we have made in the past year very distinct progress in this respect. But it is no use having our carbonizing right if the distribution does not follow suit; and I am pleased to say, as regards our distribution in the last six months, we have made progress towards coming into closer contact with the consumer, in helping him to burn his gas to the greatest advantage and with the greatest economy. On behalf of the engineering staff, and especially in connection with carbonizing and distribution, I thank you for your very kind vote of thanks.

The SECRETARY: I thank you very heartily for the vote of thanks you have just passed to the officers and workmen. There are three points to which I should like to refer, and refer very shortly. First, to compare the condition of the Company for the half year now under review with that of the half year for 1901. At that period, we were paying 5 per cent. only, though the shareholders were entitled to £5 6s. 8d. We did not earn the 5 per cent. by close upon £35,000. To-day you are receiving the full statutory dividend, you are carrying to reserve fund £9750, and you are carrying forward a balance of £11,000. This £9750 was due in respect of the half year to Dec. 31, 1901. The second point is the paragraph in the report with reference to the employees' investments in the Company. This shows that the employees have confidence in the Company; but it further shows that they are not, and do not intend to be, sleeping partners in the concern. Thirdly, I should like to draw attention to a distinct innovation—another innovation of yours, Mr. Chairman, upon which no reference has been made. Twelve years ago you suggested that the consumers should be offered stock in small amounts of £5 and upwards. Well, we have been pegging away, as you know, year after year, until to-day we have on the register close on 6000 shareholders; and I am sure it will both surprise and please you when I tell you that these consumers have invested very nearly a million of money. The exact sum is £938,551, or £157 per consumer. That is still going on, for during the next fortnight we shall have about another 750 consumers, and they will have taken up another £100,000. I thank you very heartily for the vote of thanks you have passed.

CRYSTAL PALACE DISTRICT GAS COMPANY.

An Up-to-Date Bill—The Need of Gas Experts as Administrators of the Gas Industry, and Their Reward.

The Ordinary Half-Yearly General Meeting of this Company was held last Friday, at the Albion Tavern, Aldersgate Street, E.C.—Sir GEORGE LIVESEY in the chair.

The SECRETARY (Mr. Charles M. Ohren) having read the notice convening the meeting, the Directors' report and the accounts (which were dealt with in last week's issue) were taken as read.

The CHAIRMAN, in moving the adoption of the report and accounts, said he did not wish to spend much time in speaking about them. The accounts of gas companies were now so full and complete that anyone who cared to investigate them could do so without much trouble. The result of the half year was very satisfactory. Comparing it with the corresponding half of last year, he found that, whereas they then made a profit of £15,400, in the past half year they had made £23,099. Practically the whole of the difference was gained under the head of the manufacture of gas. In the December half of 1901, they had the remainder of the high-priced coal; and though the price was still high, it was not so high as in the previous year. Altogether, under the head of manufacture, the cost was in the second half of 1901 £74,800, and in the second half of 1902, £66,360—a saving of rather over £8000. The two chief items for which they could take credit were: First, improvements in carbonizing, which had enabled them to reduce the cost by about £1400 (that was, machinery had been employed more extensively); and secondly, there was the reduced cost of about £2000 in repairs and maintenance. The proprietors would not, of course, suppose that the Directors had crippled anything by reducing the cost of repair; but the saving was owing to the fact that in previous years they had been continually improving their apparatus, until at last it had got into such a state that it cost less for maintenance than used to be the case. On the question of rates, he had nothing to say as to the amount, because there was practically no difference. The only remark he should like to make, in regard to the subject, was that all the Company wanted was to be dealt with fairly. And he would say here that

municipal trading was often very unfair to the great body of ratepayers. It was often conducted with advantage no doubt to certain people who participated in it. For instance, electric lighting by municipalities was frequently supplied at less than cost price to the few who used it; and the deficiency was made up by the general body of ratepayers. That was one of the grievances of gas companies; and another was (and this was common to all joint-stock companies, railways, gas, water, and other large manufacturing companies) that, while they were the largest ratepayers in any district in which they might be situated, they had no control whatever over the expenditure. They had not even a vote. The man who paid 5s. a week in rent had a vote for the election of a representative on the borough council; but the large ratepayers, who paid thousands a year in rates, had no vote at all. This was an injustice that would, he thought, have to be remedied some day. Regarding the report, in the second paragraph the Directors showed that they were very economical in the expenditure of capital; and the greater part of it was spent on new consumers. The next paragraph dealt with the revenue account; and it showed, as he had said, that the profit amounted to £23,099. This was more than they required to pay the dividend. They proposed to deal with the amount in this way: First, by paying a dividend practically up to the hilt —not quite, but only £119 short of it. They were entitled to pay a dividend at the rate of £5 7s. 6d. per cent. per annum; but that would be a very awkward sum to divide. It would work out to fractions of a penny in numbers of cases. They therefore proposed to pay £5 6s. 8d. instead; and this would divide to equal pennies whatever might be the amount of stock held from £5 upwards. Then when they had done this, there would be a surplus of above £3000 to dispose of. The Directors therefore thought this was an opportune time, and an advisable thing to do, to start an insurance fund. They had never started this fund hitherto—in fact, they were only entitled to start it from 1893; but they had never had a sufficient surplus to do so. The reserve fund now amounted to a respectable figure; the proprietors having, by self-denial, in the last seven or eight years, increased it by about £5000. The insurance fund was limited to 5 per cent. on the capital; and they might take 1 per cent. per annum, if they earned it beyond the dividend, to fill up the insurance fund, the object of which was to meet any unexpected loss due to accident or strikes or anything of that sort. In his opinion, such a fund was very necessary; and he mentioned two instances in London some years since where disastrous fires had been caused, and the Gas Companies were held responsible. In the case of their great strike, too, the South Metropolitan Gas Company found their insurance fund very handy. There was no fear of a strike in their own case; but a great engineer (the late Mr. Thomas Hawksley) once said to him: "Anything that is possible to happen will happen some day." Therefore, the Directors of the Company had started this insurance fund in order to have something to meet emergencies should they arise. They proposed to appropriate £3000 for this purpose. He should explain that the shareholders could not have this £3000. They could only have in dividend £119 more than was recommended; so that this £3000 could only be transferred to an insurance fund or to the balance carried forward, which amounted to £1350. He believed the proprietors would agree that it was a wise thing to establish this fund now that they were in a position to do it. Regarding the statement in the report that the Directors could not conclude it without expressing their great appreciation of the good conduct and devotion to duty of the officers and workmen of all ranks, Sir George emphasized this, and said he thought they could attribute some part of this gratifying state of things to their profit-sharing and shareholding arrangement. Some of the men, he incidentally mentioned, now held in the Company something approaching £100; and the average was £30. As to the paragraph in the report relating to the Bill, in order to save time and to simplify matters, he would at once proceed to explain the general provisions. One purpose was the purchase of 3 or 4 acres of land situated between the gas-works and the railway station. This land would be found very useful for stores, for building cottages for the workmen, and also for preventing anyone else coming so near to the works. The Board considered it would be unwise to allow other people to purchase this land, use it for various purposes, and then perhaps complain of the Gas Company as an undesirable neighbour. This purchase was not a serious matter; and would not mean much money. Then the next point was one which might be a matter for controversy—that was, the reduction of the illuminating power of the gas and the initial price. The reason for reducing the illuminating power was that, for a number of years, Parliament, goaded by the local authorities, whenever a gas company had applied for additional powers, had put pressure upon them to increase the illuminating power, under the impression that, the higher the illuminating power, the better it would be for the consumer, totally regardless of what this high illuminating power would cost the consumers where it could not be obtained from the available supply of coal. Now a principle that could not be controverted was this, that the illuminating power of gas should be just what could be obtained—and not more than could be obtained—from the available supply of coal. When he said the "available supply of coal," he meant the coal that could be bought the readiest and at the most reasonable price. In their own case, they had to go mostly to Newcastle—to the Durham coal-fields—for their coal. They could get coal from the Midlands, but it would cost them considerably more when Durham prices were normal. From Newcastle coal, they could obtain 14-candle gas. He could remember the time when gas of a considerably higher quality could be obtained from Newcastle coal; but practically the greater part of the best gas coal had been worked from the pits, and now they were getting a coal inferior to that which used to be supplied 30 years ago. They were therefore asking that the illuminating power of the gas might be reduced, because they could not supply 15-candle gas from the coal without expensive enrichment. Enrichment was objectionable—not only for its expense, but on account of its uncertainty. With the reduction in the illuminating power, they were obliged to accept a corresponding reduction in the initial price of the gas, and for this reason: It would cost them less to produce gas of the lower illuminating power; and as they did not wish to take any advantage of their consumers in the matter, the Directors said that, whatever advantage they realized from selling gas of the lower illuminating power, the consumers should have in the price charged. Consequently, it was only fair the initial price should be reduced. Then there was another matter, and that was to alter the mode of purifying the gas in order to avoid nuisance in the works, and to cheapen the cost of manufacture. A little historical information was here given by the Chairman on the question of purification; and he showed how the restrictions in regard to the infinitesimal quantity of sulphur compounds in gas, other than sulphuretted hydrogen (which restrictions he did not think were applied to 10 per cent. of the gas companies in the country), necessitated the employment by them of large quantities of lime, from the use of which the companies and their neighbours both suffered. Only lately the Company had been summoned at the instance of the Lewisham Board of Works for creating a nuisance in connection with their purification operations. The Magistrate, however, did not fine them, because he practically said he recognized that the Company were bound by Act of Parliament to remove these sulphur compounds; and they could not do it without using lime, which necessarily caused a nuisance. Therefore he could not require the Company to abandon its use. Now they were going to ask Parliament to relieve them from this condition; and he (the Chairman) believed they would be able to make out a good case. The next important matter in the Bill was the provision to enable the Company to offer new issues of stock direct to the consumers and employees at a fixed price, as near as might be to the current market price. Since 1893, they had been obliged to issue their new stock under the auction clauses or by tender. But these were not the most satisfactory methods. When they wanted to get rid of stock, in selling it by public auction, they must put a low reserve price on it, because the constituency to bid for it was limited, and it would not be taken unless the price was sufficiently tempting. Then when it was put at a low price, the speculators came in, and bought in large quantities to sell again to their own profit. The Directors therefore thought it would be better (and Parliament had already sanctioned this in several cases), instead of offering the stock by auction or tender at a minimum price, to offer it to the consumers at a fixed price, as near as might be to the market price of the day, and not more than 5 per cent. below it. They asked for this 5 per cent. because they might be issuing stock in January, when the original stock had accrued a half-year's dividend which amounted to 2½ per cent.; and therefore they wanted an allowance of 2½ per cent. below the market price to meet the difficulty. Then there might be times when it would be rather difficult to issue stock; and therefore they asked for a limit of not more than 5 per cent. below the market price. The South Metropolitan Gas Company recently offered £100,000 of new stock in this way. The market price was £118; and the Directors could have fixed the price at £113, or £5 below the market price. They knew the market price was not a true criterion of the value. There were exceptional reasons why it was low at the time, and so they fixed the price at £120, and the consumers had taken it all. It was a satisfactory investment for the consumers. In the opinion of the Directors, this was a better way of issuing new stock than by auction or tender; and so they asked that power might be granted them by Parliament to adopt that better system. Gas companies wanted friends; and the friends they wished for were among their consumers more than anywhere else. The great financier who bought up £10,000 or £5000 of stock at a time cared nothing about the Company; but the consumer who invested his £5 or £10 or more in the Company was the man who would be their friend, and would stand up for them on occasion. At any rate, the Board believed this was the case; and so they proposed to offer the stock to the consumers in £5 lots, or multiples of £5. He believed they would in this way get a higher price for the stock than by offering it by auction or tender; and, furthermore, they would have the great advantage of making friends. The employees, too, could take the stock at the same fixed price, as the Directors wished to give them a direct financial interest in the prosperity of the Company. Another thing in the Bill was power to enable the shareholding employees, under certain conditions, and with the sanction of the Board of Trade and of the shareholders in general meeting, to elect one or more, but not exceeding three, of their number to be Directors of the Company. He daresay some of their friends would say this was a very dangerous act. He would not call it a "precedent," because it would not be one. He had been connected with the South Metropolitan Company all his life, and had been Chairman since 1885, and never but once had he had any difficulty with the shareholders or the Directors, and the difficulty was caused by the proposal to allow the employee shareholders to elect Directors. The Board was divided on the subject. His friend, the Deputy-Chairman of this Company (Mr. Robert Morton), who was also a Director of the South Metropolitan Company, was with him; but there was opposition—not unfriendly opposition, but a genuine opinion that it was an impossible and dangerous innovation, and might result in mischief at some future time. Some of the shareholders took the same view; but the majority took the other view, and agreed to the proposal when it was put before them for an application to Parliament. That was in 1896; and the authority of Parliament was then obtained. He showed how well the power was safeguarded; and then pointed out that in 1898, in connection with the South Metropolitan Company, the first two Workmen Directors were appointed. They had sat on the Board ever since; and a year ago the officers elected one, so that there were now three employee Directors on the Board. The Workmen Directors (who had now been on the Board four years) had taken part in all the work of the Board. Not a single thing or matter of any kind had been kept from them; they had not in the slightest degree betrayed their trust; and in many points they had been extremely useful. He thought this was going in the right direction; and it seemed to him to be the solution of the great trouble between capital and labour. It lay in the direction of partnership. If they could get their employees of all ranks to be shareholders, they would necessarily take a greater interest in the welfare and prosperity of the Company. It must be remembered that the employees now held stock to the value of £13,500; and the time would come, if they went on increasing their holding, when naturally they

would say: "We are large stockholders; why should we not have a voice in the management of the Company." There was an advantage in their having a voice in the management of the Company. Give a man responsibility; and he was changed immediately. Let the men feel their responsibility, and they would take a far greater interest in the Company than they could if they had no interest whatever. Besides this, it was better for the Directors and the shareholders to go forward first with this proposal than that they should wait until pressure was put upon them to bring it forward. Another matter in connection with the Bill to which he wished to refer, was the proposed change in the name of the Company. The Company was known as the Crystal Palace Gas Company. Its proper name was "The Crystal Palace District Gas Company;" but nobody gave them their proper appellation. They were always called the Crystal Palace Gas Company; and it looked as though it was an appendage, or belonged to the Crystal Palace itself. What was essential in the name of a Company was a short title that people would use; and in the Bill the name inserted was the "Sydenham Gas Company." He pointed out that this was unsatisfactory, because the Company supplied a larger district than Sydenham, comprising half of Lewisham, nearly the whole of Beckenham, part of Camberwell, part of Lambeth, and part of Croydon. Their difficulty was to get hold of the right name; but they could alter it, or leave it alone, right up to the Committee stage of the Bill in the second House. The only other matter in the Bill was the provision regarding the making of nominations in respect of the transfer of employees' stock in the case of death. When a man had under £100 in the stock of the Company, it would be some trouble for him to make a will; but the Government in connection with depositors in the Post Office, friendly societies, and other associations of the kind, allowed a working man having not more than £100 of savings in them, to fill up a nomination paper, saying to whom the property should go. This saved all the trouble of a will, and facilitated the transfer. These were the only matters to which he had to refer in connection with the Bill; but reverting to the report, there was the point as to the remuneration of the Directors. This was a matter about which he had not the least hesitation in speaking. It was commonly supposed to be a delicate matter; but he was not going to treat it in that way. The facts were these: The remuneration of the Directors was fixed in 1876 at £1500; but since then the business had increased nearly fourfold. He was not going to complain of £1500 a year to divide among six Directors; but he was going to make a declaration on the subject dealing with it in a wider sense. It was important—highly important—that public companies should have the ablest men to work them. There was a very common complaint, and a very just complaint, being made that company directors were a failure—at any rate, that they had failed to this extent, that a great many of them knew nothing of the businesses they were called upon to direct. The other day he was having a conference with the Directors of a Gas Company in an important provincial town; and they had on that Board some of the best men in the town. The Chairman was a leading banker—at all events, one of the principal bankers in the town. He (Sir George) was telling them that the directors of gas companies, and especially the chairmen, should understand the business of gas making and the business of conducting a gas undertaking; otherwise the board were in the power of their officers. This Board he was speaking of felt they were in the power of their chief officer. They said they did not know whether he advised them rightly or wrongly. His (Sir George's) reply was: "The chairman of a gas company ought to be thoroughly conversant with the business to be of any good." Upon this, the Chairman remarked: "The chairman of a bank would not be of much use unless he understood banking." But if they were to get men of this class—men who understood the business of gas making—they must be prepared to pay them. He would come to the question of chairman directly; but, as to the ordinary directors, there were men quite willing to go on to a Board and to take their fees - good men perhaps in many respects. He was not going to say that all the directors should be gas men; but he did say that on a Board of this kind they wanted the ablest men they could find. They did not want men who went in for a multiplicity of boards. The man who was a director of a dozen companies, or a good deal less than a dozen (he should put the limit at much less than that), was not much good to any of them. If they were to have men of ability in their respective callings—business men, commercial men, men who were engaged in mechanical or other large businesses—if they were to ask them to act on boards of this kind, and say they were not going to have men who were simply guinea-pigs, and not going to have men who were in a great number of companies, then they must be prepared to pay them reasonable and proper fees; and, compared with other concerns, he did not think the fees that the Directors of this Company were getting, were sufficient to ensure them obtaining the best class of men in the future. He was pleased to think the men they had now would compare with any board in the City of London; but they must look to the future. Then as to the question of the Chairman. He had been in the position of chief officer of a company where none of the Directors knew anything at all about the gas business; and he was then practically master of the business. It was a most unsatisfactory position both for the Directors and himself. The Chairman was a good man of business; but he knew nothing about gas. He (Sir George) could say this or that should be done, and it was done; but he might not have been a man of sound judgment. They could have a capable engineer—a capable technical man; but it did not necessarily follow that he would be a man of the soundest or sufficient judgment to advise a board the best course to take. Therefore, they wanted on gas companies' boards more than one expert; the chairman certainly ought to be an expert. He would tell the proprietors how the fees had been divided hitherto. The Chairman had received £300 a year; and the other five Directors £240 each He had personally nothing to say about that. He did, however, want to impress upon the proprietors that, when they had to appoint a successor to him, this Company was of sufficient importance to justify the proprietors in endeavouring to get the ablest man they could find. But they would not get him for £300 a year. They did not want a man well past the prime of life. The Chairman of this large joint-stock undertaking ought to be a man in the prime of life, and a man who had energy, and who was conversant with the business. Such a man would not take the office of Chairman, and give up constant, lucrative employment, unless he was paid adequately. He believed that, for his successor, the Company should be prepared to pay £750 or £800 a year. This was the main reason he suggested this increase in the Directors' fees, in order that they should be prepared for the future. Personally, he was not going to take £700 or anything like it. But if they agreed to the proposal that the fees should be increased to £2500, it would not all be divided. A considerable portion of the increase—£300 or £400—would not be touched. It would be held in reserve to offer to a suitable future Chairman; so that, in the event of the chair becoming vacant, the Directors could say to a capable man, "Now we are prepared to offer you this amount of fees to serve us." The proprietors might say: "Why not leave this matter, then, until the occasion arises?" The argument against this was that, if it was not done before then, it would not be done at all. Only one small proprietor had written protesting against this (as he called it) "enormous" increase in the Director's fees. The Chairman read the letter, and said that if the proprietors present agreed with the writer after his (Sir George's) explanation, the Directors would not complain.

Sir J. FORTESCUE FLANNERY, M.P., seconded the motion.

Mr. C. E. MARSHALL concurred with the writer of the letter regarding the Directors' fees, and said the present fees were much more than the directors of other gas companies were paid. He gave particulars regarding the Devonport and Hastings Companies in support; and he hoped the Directors would consider the present £1500 sufficient for the services they rendered to the Company.

Mr. W. F. WOODS, on the other hand, was favourably impressed by the proposition as it was put from the chair, regarding it as a provision for what was to arise in the future. He appeared more concerned over any issue of new stock depressing the present value of the stock, and referred to the fact that at one time the stock stood at £135, but it had since been depressed to £119. He had little doubt that the last new issue of stock had something to do with this depression in value.

Mr. POWELL suggested, as an alternative to the Directors' proposal, that the fees of the Chairman should be increased to £500 a year, with smaller increases to the other members of the Board. He hoped there was not the slightest suggestion in Sir George's mind, in talking about a future Chairman, of his going to part from them.

Mr. T. E. NALTY suggested a compromise to the effect that the Directors' fees should be £2000.

The CHAIRMAN, in reply, pointed out to Mr. Marshall that the make of gas in the case of the Hastings Gas Company was only one-third of the make of their own Company; so that, according to this proportion, the Directors ought to have £3000 a year. (Laughter.) As to the fall in the price of the stock, the comparison that had been made was with the price that ruled before the war, when everything was excessively high—in fact, he had said repeatedly that gas stocks ought never to be so high as not to yield 4 per cent. on the investment. Returning to the question of the Directors' fees, he said that although the proprietors might vote the £2500, he would promise them that, so long as he was their Chairman, they should never see more than £2200 entered in the accounts. It was all very well to say "put it off," and that they did not want to see him disappear from the chair. He did not hold this position for the fees. Whether the Chairman's fees were £500 or £1000, the fees would not keep him there. His wants were few, but he believed he was useful to the Company; and he should be sorry to sit there if the fees were considered equal to his services. He wanted the Company to set a precedent. The gas industry was suffering from the top to the bottom, all over the country, from the insufficiency of the reward that was offered to those who had to bear the brunt of the business. The engineers, managers, and directors were not paid enough to get the most capable men. There was no inducement for first-class men to enter the profession. They were constantly complaining that young men of ability were not coming into gas. There was not sufficient prospect held out to them. What he wanted was that the highest prizes should be offered to them in the gas profession, and that these prizes should be worth seeking. As to the selection of chairmen and directors, there was no weaker spot in the gas administration of this country; and it had been the rule to select men not for their qualifications, and not for their knowledge of the business, but for other reasons, with the result that the greatest incompetence and ineptitude were found in the direction of gas companies. He did not wish to individualize, but he could point out glaring instances of incompetence and ineptitude in important gas undertakings. (Laughter.) What was wanted was that a chairman of a gas company should be selected from men who had proved their capacity and ability, and that he should be offered such a remuneration as would make it worth while his giving up a good and lucrative appointment and take the position. He (Sir George) adopted this proposal thoroughly as his own; and if the proprietors accepted it, it would be recorded as their deliberate opinion that a sufficient reward should be paid in the gas industry to obtain the best men. He (the Chairman) would next April enter on his seventieth year. Except that he believed he was doing a useful work, he should retire directly. He asked the proprietors to seriously consider this matter, and to set a useful precedent. He hoped the meeting would pass the resolution; and thus show their confidence in the Board, and in him personally. But he would ask the proprietors not to do this for him, unless they thought it right.

The motion for the adoption of the report was unanimously agreed to.

On the proposition of the DEPUTY-CHAIRMAN (Mr. Robert Morton), seconded by Mr. JABEZ LIGHT, a dividend at the rate of 5 per cent. per annum on the preference stock and 5¾ per cent. on the ordinary stock, less income-tax, was declared.

Proposed by the CHAIRMAN, and seconded by Mr. THOMAS GUYATT, Mr. Morton was re-elected a Director of the Company, as was also Mr. Jabez Light, on the motion of Sir FORTESCUE FLANNERY, seconded by Mr. MORTON.

Mr. E. K. BLYTHE proposed, and Mr. WEBSTER seconded, the re-election of the retiring Auditor (Mr. T. Guyatt); and the proposition was agreed to.

The CHAIRMAN then moved the adoption of the resolution as to the remuneration of the Directors being increased to £2500 per annum.

Mr. POWELL seconded the motion, and it was passed, with only one dissentient.

The CHAIRMAN heartily thanked the proprietors for their confidence.

An Extraordinary Meeting was then held for the purpose of approving of the Bill now before Parliament.

The SOLICITOR (Mr. E. K. Blyth) having read the heads of the Bill,

The CHAIRMAN moved, and the DEPUTY-CHAIRMAN seconded, a resolution approving of the Bill; and it was unanimously carried.

The thanks of the proprietors were passed to the Chairman and Directors and to the Engineer (Mr. S. Y. Shoubridge), the Secretary (Mr. C. M. Ohren), their respective staffs, and all the employees.

This concluded the interesting proceedings, which had lasted little short of two hours.

SHEFFIELD UNITED GASLIGHT COMPANY.

Half-Yearly Report and Accounts.

According to the report which the Directors of the above-named Company will present at the half-yearly general meeting on the 9th prox., the consumption of gas in the six months ending the 31st of December was practically the same as in the corresponding period of the year 1901; there being a decrease of only 0·1 per cent. They regard this as satisfactory, as, owing to the exceptional mildness of the winter, and the largely extended use of incandescent burners, which are very economical to the users, a greater falling off might, they say, have been expected. The accounts accompanying the report show a revenue of £134,875 from the sale of gas; a sum of £7279 received as meter and stove rental; residuals produced £60,975; and the total receipts were £205,522. The expenditure on the manufacture of gas amounted to £117,776 (coals costing £62,061); on distribution, to £15,015; and on management, to £5286—the total expenses being £150,303. This left a balance of £55,219 to go to the net revenue account. The working for the half year resulted in a surplus profit of £12,060, after paying the usual dividends, as follows: On the "A" stock, £6750; on the "B" stock, £10,499; and on the "C" stock, £26,175. In view of the prosperous state of the Company's affairs, as indicated above, the Directors have felt justified in announcing a further reduction of 2d. per 1000 cubic feet in the price of gas, to take effect from the 1st of April. The charges will then be 1s. 10d., 1s. 8d., and 1s. 6d. per 1000 cubic feet, according to consumption; while the price for engines using 100,000 cubic feet (£9 3s. 4d. worth) of gas per annum will be 1s. 6d. per 1000 cubic feet.

NEWCASTLE AND GATESHEAD GAS COMPANY.

Improved Plant and Increased Business.

At the Meeting of the Newcastle-on-Tyne and Gateshead Gas Company to-morrow, the Directors will present a report which will convey to the shareholders the gratifying news that the quantity of gas sold in the past year was again in excess of that of any previous twelve months, notwithstanding the mild weather of the concluding quarter, and the depression in trade during the whole period; the latter circumstance naturally affecting the use of gas for motive power purposes. The new gasholder, capable of holding 5½ million cubic feet, at St. Anthony's, was completed and brought into use in October; and stoking machinery has been installed in No. 2 retort-house at Redheugh. Three out of the four houses at the latter works are now equipped with this machinery, and considerable economy in the cost of carbonization has been thereby effected. During the past year, 21 miles of mains were laid in extensions and renewals; 9255 new consumers were added, making a total of 56,594; 8203 prepayment installations (comprising slot meter, cooker, and gas-fittings) were put in, making a total of 13,288; 960 ordinary cooking-stoves were fixed, bringing up the total to 5610; and 441 additional public lamps were erected, making 11,553. The new show-room has proved useful to the consumers and beneficial to the Company; and, from the first day of the current year, the Company have undertaken, for a fixed charge per burner, to relieve consumers of attention to their incandescent fittings. The charges for gas supplied to certain of the outlying districts have also been re-adjusted, so as to bring, as far as practicable, the whole into greater harmony, taking into account, as regards each district, its distance from the city and the consumption of gas.

The accounts accompanying the report show that the sale of gas produced a sum of £248,256; rental of meters and stoves, £16,190; and residual products, £95,718—the total revenue being £362,539, compared with £387,066 for the year 1901. The expenditure on the manufacture of gas was £220,314 (coal and oil costing £136,633); on distribution, £22,734; and on management, £11,074—the total expenses being £273,520, against £324,114 before. At the close of 1901, the balance carried to the net revenue account was £62,952; now it is £89,019. After providing for the fixed charges, there remains a balance—including the sum of £8397 brought forward—available for appropriation of £82,337, out of which the Directors recommend payment of dividends for the past half year on the preference stock at the rate of 4 per cent. per annum, and on the ordinary stock at the rate of 4½ per cent. per annum; making, with the dividends paid in August last, a distribution for the whole year at the full statutory rates of 4 and 4½ per cent. respectively. This will leave the sum of £14,476 to be carried to the credit of the current year. The Directors add that the revenue arising from the sale of residuals, particularly tar and sulphate of ammonia, was very satisfactory.

Extension of the South Molton Gas-Works.—It was decided by the South Molton Town Council last week to accept the tender of Messrs. Cockey and Sons, of Frome, for the extension of the gas-works in accordance with the plans of Mr. Willey, at a cost of £1132.

PROVINCIAL GAS AND WATER COMPANIES.

GAS.

Profit-Sharing and Improved Plant at Chester.

According to the Chairman (Mr. John Gamon), the profit-sharing scheme some time since inaugurated by the Chester Gas Company is working exceedingly well, and has produced thorough contentment among the men, three of whom have become shareholders. Considerable economy in working has also been secured through the improvements recently effected in the carbonizing department. The co-operation of the workmen and the better plant erected two years ago, together with the coke conveying apparatus completed this year, have enabled the Company to make a saving of £800 on the working expenses, as compared with the previous twelve months. At the half-yearly meeting last week, an increase in consumption was reported of no less than 7,380,500 cubic feet; and, in spite of the prevalence of electric lighting, the increase in the city alone was 6,250,000 cubic feet. Notwithstanding a reduction in the price of gas, the income of the Company only fell short of that of 1901 by £350. As soon as the liabilities incurred by the alteration of the retort-house are cleared off, the Directors will consider the advisability of making a further reduction in the price of gas. Dividends were declared at the rate of 4 per cent. on the preference stock, and 5 per cent. on the ordinary stock.

Concession to Consumers at Bath.

Though the quantity of gas sold by the Bath Gas Company in the six months ending the 31st of December was about the same as in the corresponding period of 1901, the sum realized was less, on account of the reduction made in the price from June. This, however, was more than covered by the lower cost of coal and the decrease in the manufacturing expenses. The returns for residuals also improved. These facts are shown by the accounts which the Directors will present at the half-yearly meeting of the Company on the 27th inst. The revenue from the sale of gas was £30,208, whereas in the same period last year it was £32,053; residuals producing £7560, against £6778, and the total receipts being £40,760, compared with £41,651. On the other hand, the manufacture of gas cost £22,499 in the past six months, and £26,711 in the second half of 1901. The balance carried forward then was £7719, whereas now it is £9260. The amount available for distribution is £12,178; and the Directors recommend the declaration of the maximum dividend of 5 per cent. per annum on the consolidated ordinary stock of the Company. Owing to the favourable state of the revenue account, they make a further reduction of 1d. per 1000 cubic feet in the price of gas as from Christmas last.

Lower Prices and Increased Business at Derby.

A very satisfactory statement was made by Mr. Henry Swingler, the Chairman, at the half-yearly general meeting of the Derby Gas Company last Friday. He said the Company had had a most successful year, notwithstanding that some twelve months ago the Directors reduced the price of gas 3d. per 1000 cubic feet, and for motive power down to 2s. 3d., and that the full force of this reduction had had its effect on the year's working. Turning to the revenue account, Mr. Swingler said that although 10¾ million cubic feet more gas was sold during 1902 compared with 1901—the figures being 544¾ millions and 534⅛ millions respectively—the money received amounted to £69,985; being a reduction of £2458. The value of 10⅝ million cubic feet of gas, at 2s. 6d. per 1000 feet, amounted to £1312; and if to this was added £2458, the reduction in rental, the total would be £3370, which sum the Company gave to their consumers last year by the reduction in the price of gas. But in 1901 this reduction was in force for three months, or the sum would have been very much greater; for 1d. per 1000 feet on 554 millions meant nearly £2300 to the consumers. Some eighteen months ago, the Directors reduced the price of gas for motive power to 2s. 3d. per 1000 cubic feet; and, if he might take the public into his confidence, he might say the Engineer (Mr. J. Ferguson Bell) wanted him to advise the Directors to make a still further reduction. This he should be pleased to do as soon as he felt the Company could afford it. Meanwhile, it was satisfactory to know that the concession made had been fully justified. During the past three years, the number of gas-engines at work in Derby and the district supplied by the Company had more than doubled. Dealing with the residuals, Mr. Swingler stated that the coke and breeze sold in the year amounted to 29,212 tons, compared with 27,852 tons during 1901; being an increase of no less than 3360 tons, which was the more satisfactory as upwards of 1000 tons less coal was used. This extra quantity of coke and breeze sold was due to the improvements effected at the Litchurch works, were coke-handling plant was put down some twelve months since, and a new steam-raising plant. The Directors anticipated a much larger fall in the receipts for coke; but, fortunately, the extra quantity sold in a large measure neutralized the drop in prices. The siding at the Litchurch works had been entirely relaid, and the 16 or 17 turntables done away with, and replaced with curves, which would effect a considerable saving, not only in labour but in maintenance. The Directors have completed the purchase of the Duffield Gas Company's undertaking, and have laid and connected a new main; so that the whole of the supply is now delivered from the Derby works. The accounts presented showed a sum of £12,659 available for distribution; and dividends were declared for the half year at the rates of 10, 7, and 5 per cent, per annum. At a special meeting held after the ordinary business had been disposed of, formal assent was given to the Bill promoted by the Company, the objects of which have already been defined in our columns.

WATER.

Sunderland and South Shields Water Company.

At the annual meeting of the Sunderland and South Shields Water Company on Thursday, the Directors will present accounts showing that the water-rental, &c., last year amounted to £92,830, while the expenditure was £48,176; leaving £44,654 to go to the profit and loss account. They recommend a dividend for the past

six months at the rate of 4½ per cent. on the ordinary and preference stocks, of £3 3s. per cent. on the additional capital stock, and of £2 5s. per cent. on the new stock; making, with the interim dividend paid in September, £6 6s. and £4 10s. per cent. respectively for the year.

Increased Population in Colne Valley.

The Colne Valley Water Company is a prosperous and steadily progressive concern; and at the meeting last Tuesday, both Directors and shareholders expressed satisfaction at the state of affairs. The profit transferred to dividend and interest account in respect of the revenue for the half year to Dec. 31 amounted to £9625; being £1039 more than in the corresponding period of the previous year. A further sum of £500 has been placed to the credit of the contingency fund account; and after paying the interest on the debenture stock and preference shares, there remained a balance of £7857. After payment of a dividend at the rate of 7 per cent. per annum, a balance of £1028 would be left to be carried forward. In moving the adoption of the report and accounts, the Chairman of the Company (Mr. J. R. Hollond) said that, with regard to the water-rates, the total payable for the half year to December last was £14,912; while the total for the same six months of the preceding year was £13,774—showing an increase of £1138. Adding to this the increase of £933 for the first half of last year, it would be seen that the total increase for 1902 was £2071. This was about up to the average of recent years; the increase for the five years since 1897 having been at the rate of over £2000 per annum. The supplies laid on in the six months numbered 397, estimated to yield £1300 a year; while for the June half the figures were 342 and £886. The total estimated amount derivable from supplies laid on in 1902 was therefore £2186. This was a larger addition than had taken place in any previous year. As showing how the population of the district supplied by the Company had increased of late years, a few figures taken from the Census returns might be of interest. The total increase of population from 1871 to 1881 was 3000; in the next decade, from 1881 to 1891, it was 6000; while in the ten years from 1891 to 1901, it was 19,000. Of the last-named increase of 19,000, over 11,000 was within the area supplied under the 1885 Act, which included Harrow—thus showing the value of the district then acquired. There was no item of expenditure in the half year under review which called for very special attention—beyond rates and taxes, which continued to increase. It would be seen that, while the gross income was £1136 more, the expenditure was only £97 more. The net profit for the half year was sufficient to have enabled the Directors to propose a higher dividend on the 10 per cent. maximum shares; but they considered it better to leave this at the same figure, and carry forward a larger amount on the present occasion. With regard to the contingency fund account, the Directors had, as promised at the last meeting, taken the opinion of the Auditors as to writing off an amount each year for depreciation of machinery; and the Auditors had stated that, in their view, it was not necessary to act otherwise than as the Company had hitherto done. It had been the custom for many years to transfer a certain amount from the revenue account to provide for any special or heavy expenditure; and the Auditors said in their letter on the subject that the course adopted by the Board was the correct one, and met with their entire approval. Since 1884, the amount so transferred had amounted to over £10,000; and during the past eleven years, it had averaged over £800 per annum. The water pumped in the past half year amounted to 360½ million gallons, or just under 2 million gallons a day—about the usual average according to the number of consumers. With regard to the recent issue of shares, the Board looked upon the result as most satisfactory, considering the state of the Money Market at the time. The total number of shares applied for was more than 50 per cent. above the number to be issued; and the average price realized was just under £20 per share. To illustrate the progress made by the Company in the eyes of investors, he might quote the prices obtained for different issues of shares during the last few years. They were as follows: In 1896, £13 17s. 5d. per share; in 1897, £15 16s. 7d.; in 1899, £17 4s. 10d.; in 1900, £18 16s.; in 1901, £19 9s. 8d.; and in 1902, £19 19s. 3d. The report and accounts were adopted, and a dividend for the half year at the rate of 7 per cent. per annum, less income-tax, was declared. The Chairman then proposed that the salary of the Secretary (Mr. W. Verini) should be increased as follows: For the year 1903, to £800; for 1904, to £850; and for 1905, to £900, at which figure it should remain until altered by some future general meeting. He said that Mr. Verini's present salary was fixed eight years ago; and since that time the capital of the Company had been increased from £227,000 to £345,000, and the dividend from 4 per cent. to 7 per cent. Mr. Verini had been in the service of the Company for thirty years; and the Directors felt that he was fully entitled to the extra remuneration which they were now asking the shareholders to give him. Mr. C. E. Keyser, in seconding the resolution, said he hoped the proposal would be supported by the shareholders as well as by the Board. It was greatly due to the constant attention the Secretary had given to the work that the undertaking had been progressing in such a satisfactory manner for so many years. The motion was unanimously agreed to.

CHELSEA WATER-WORKS COMPANY.

An Extraordinary General Meeting of this Company was held at their Offices, Commercial Road, Pimlico, on the 12th inst., under the presidency of Mr. F. S. CLAYTON, "to consider and determine as to the raising of the sum of £22,515 by the creation and issue of debenture stock under the powers of the Metropolis Water Act, 1899."

The SECRETARY (Mr. G. H. Gill) having read the notice calling the meeting,

The GOVERNOR stated that the sum mentioned was the amount which had been expended by the Company on certain works executed by them under the provisions of the Metropolis Water Act, 1899. These works were in connection with the intercommunication of the systems of the eight London Water Companies. Their own part of the work was finished; and he believed that the work of all the Companies was on the point of completion. As soon as the entire cost of their own portion of the work could be ascertained, the Directors applied to the Local Government Board for their consent to the creation and issue of debenture stock to repay the Company for their outlay. In due course, the Local Government Board gave them a formal memorandum of consent, with the condition that the stock should be raised "in accordance with the provisions contained in the most recent Act for the time being with reference to the issue of debenture stock by a Metropolitan Water Company." The most recent Act on the subject was one which had been obtained by the Kent Company; and it authorized the creation of debenture stock with interest at the rate of 3 per cent. That being so, the stock which the Directors were now asking for powers to create and issue would bear 3 per cent. Before formally proposing the resolution, he desired to emphasize the fact fact that the scheme for establishing intercommunication, as authorized by the Metropolis Water Act, 1899, was propounded by the Companies of their own action, and not at the instance of anyone else. The facts were as follows: The Royal Commission, which was presided over by Lord Llandaff, received from the Companies certain proposals on the subject, accompanied by an offer on their part to introduce into Parliament a Bill for the purpose of carrying out the scheme. The Royal Commission thoroughly appreciated the situation, and saw the importance of the suggestion made by the Companies; and they lost no time in issuing an interim report dealing solely with the question. This report in due course came before the Local Government Board. The matter was taken up with great keenness by the Government, who lost no time in introducing a Bill on the subject, which ultimately received the Royal Assent.

The SECRETARY, at the request of the Governor, then read the letter from the Local Government Board, dated the 14th ult., enclosing their formal consent, under seal, to the raising of the sum mentioned.

The GOVERNOR afterwards proposed a resolution authorizing the creation of 3 per cent. redeemable debenture stock sufficient to produce £22,515, with authority to the Board to issue and dispose of the stock "in such manner, in such proportions, at such time, and on such terms, and subject to such conditions of sale, as may by the Directors be deemed expedient from time to time"

The DEPUTY-GOVERNOR (Mr. Jackson Hunt) seconded the motion.

Mr. GIBBS inquired when the stock would be repaid.

The GOVERNOR replied that it could be redeemed in 25 years at the Company's option. The section of the Act dealing with the point was as follows: "All debenture stock created under the powers of this Act shall be issued subject to the condition (to be expressed on the certificate of such stock) that the stock may be redeemed at par by the Company at any time after the expiration of 25 years from the date at which it is issued; the Company giving six months' previous notice to the registered holder of such stock of the intention so to redeem the same."

The resolution was carried unanimously.

ELECTRIC LIGHTING NOTES.

Check to the Free-Wiring System at Swindon.

The free-wiring system promoted by the Corporation of Swindon has received a check. At a recent meeting of the Council, it was reported that some of the ratepayers had, through a solicitor, informed the Town Clerk that the proposal for the wiring of customers' premises, and the supply to them of fittings and lamps, was illegal, and that if the Corporation went on with it, proceedings would be taken to restrain them. The Town Clerk reported that he had obtained Counsel's opinion on the matter, and as this was unfavourable to the Corporation, it was decided that the scheme should not be proceeded with until such time as the necessary parliamentary powers were obtained. Alderman Skurray said the abandonment of the project was a great disappointment. There were, however, many ways of defeating the opposition, and they should be tried.

Undue Interference with Electric Light Wires.

The Finchley Electric Light Company, Limited, scored against the Finchley Urban District Council in the Court of Appeal last Wednesday, on the question of the right to run their wires across a road without the consent of the Council. The latter obtained in 1899 a Provisional Order for supplying electricity in their district; but it was stated that they had not provided any works for the purpose, and the supply had been exclusively in the hands of the Company. It was impossible for them to lay wires under the streets without obtaining the permission of the Council to break open the surface; and as they had found some difficulty in obtaining it, they carried their wires by means of standards. On Sept. 28, 1901, the Company, being under agreement to connect their cables with the house of a customer in Hendon Lane, carried a wire across a road, known as the Regent's Park Road, for the purpose. The wire was more than 30 feet above the roadway, and the Company contended that they were entitled to carry and maintain it without the leave of the Council. On Oct 1, 1901, the latter caused the wire to be cut, and threatened that in the event of its being restored they would have it cut again. On the 16th of October, an interlocutory injunction was granted, restraining the Council from interfering with the Company's lines or cables, or from doing any act whereby they might be hindered or obstructed in carrying them over or across any roads or streets at a height not less than that required by the regulations prescribed by the Board of Trade; and they sought, before Mr. Justice Farwell, at the trial, to have the injunction made perpetual. His Lordship, however, dismissed the action, holding that the property vested in the Council absolutely; but, having regard to the conduct of the parties towards each other, he would not allow costs. The Company appealed from this decision; and the Court (consisting of the Master of the Rolls and Lords Justices Romer and Cozens-Hardy) allowed the appeal. They held that the Local Authority had jurisdiction over so much only of the area above and below a street as was necessary for the ordinary user of the street; and they restrained them from interfering with the Company's wires, and ordered them to pay the costs both in that Court and the one below.

REPORT ON THE PUBLIC LIGHTING BY ELECTRICITY AND GAS OF THE CITY OF WESTMINSTER.

In compliance with the instructions of the Lighting Sub-Committee of the Works, Sewers, and Highways Committee of the Governing Authority of the City of Westminster, the Chief Engineer (Mr. J. W. Bradley) has issued a highly instructive report on the public lighting by electricity and gas, with a statement of cost in each of the districts of St. George (Hanover Square), St. Martin, St. Margaret and St. John, the Strand, and St. James, in which he deals with the constituent parishes separately The following are some extracts from the report :—

St. George's.

Prior to the introduction of electric light, the lighting of this parish was effected by means of flat-flame gas-lamps burning 5 feet per hour in the Inwards and South Belgravia districts, and 4 feet per hour in the Grosvenor Place district, with a few lamps in special situations burning 6 feet, 8 feet, and 10 feet per hour. The gas to the lamps in the two former districts was paid for by the average meter system, burning on a scale of 3830½ hours per annum, and in the latter by contract, on scale burning 3940 hours per annum. At the end of the June quarter, there only remained 544 gas-lamps; and these will be removed on the completion of the electric installation. But there will remain about 46 incandescent lamps in the streets on the Chelsea borough boundary, which will cost about £232 per annum.

The late Vestry entered into an agreement, dated Oct. 17, 1900, for thirty years terminating on Aug. 26, 1930, with the Westminster Electric Supply Company for the supply and fixing of a minimum number of 600 arc lamps, with power to the Vestry to increase the number. The lighting is to be on a table set out, burning 3940 hours per annum, and at the following charges :—

Watt		Per Annum. Per Hour.
750	arc lamps	£32 and 1·92d. per lamp for extra lighting.
500	,,	£22 ,, 1·32d. ,, ,, ,,
120	,,	£4 ,, 0·24d. ,, ,, ,,
60	,,	£3 ,, 0·18d. ,, ,, ,,

These charges are subject to a cumulative rebate of ½ per cent. per annum for each year after the first year.

With regard to the cost of street lighting in this parish, in making a comparison between the previous gas lighting and the present electric lighting, I find that gas lighting during the years ending March 25, cost: 1896, £10,093 4s. 1d.; 1897, £9679 0s. 6d.; 1898, £9988 2s. 2d.; 1899, £9739 8s. 10d.; and 1900, £9005 14s. 6d. Or an average of £9700 10s. per annum.

The erection of electric lamps throughout St. George's is now nearly completed, and when finished will consist of 8 750-watt lamps at £32=£256; 945 500-watt lamps at £22 = £20,790; 177 120-watt lamps at £4 = £708; and 40 120-watt lamps at £4 = £160—total cost per annum £21,914.

St. Martin-in-the-Fields.

Prior to the introduction of electric light, this parish was lighted by means of 6 feet ordinary flat-flame burners. On Sept. 17, 1899, an agreement was entered into with the Charing Cross and Strand Electricity Supply Corporation for the lighting of a number of the main streets; and the installation consists at the present time of 100 lamps. The agreement is for 21 years, determinable at the end of seven or fourteen years; but, if so terminated, the Vestry shall purchase the Company's mains at a fair price settled by arbitration as between a willing vendor and a willing purchaser. The charge is fixed at £28 per lamp per annum; and 1½d. per hour for extra lighting.

Concurrently with the introduction of electric lighting the Vestry proceeded to improve the lighting of the remaining side or minor streets; and, after experimenting with several lamps of the incandescent type, eventually adopted the system of the Street Lighting Company of Liverpool, and fixed their type of lantern and burner. The principal feature of the lantern is that it is so constructed as to avoid the use of the bye-pass light (which, in the case of the St. Margaret's lamps, was taken to consume ⅓ cubic foot of gas per hour), and to light the lamps in the ordinary way by means of a torch; two spring doors being provided for this purpose at the top of the lantern, instead of in the ordinary position at the bottom. The vibration set up by the traffic, wind, &c., and which is a cause of great destruction of mantles, is avoided, by the burner, chimney, and mantle being suspended by springs from the top of the lantern; the necessary connection between the governor and the burner being effected by a short piece of rubber tube.

The gas installation of this parish consisted at the June quarter of the following :—

249	3·25 feet incandescent lamps on scale	£1	10	11	..	£384 18 3
2	3·25 feet ,, ,, ,,	1	10	11	..	3 1 10
6	5 feet gas ,, ,,	2	7	7	..	14 5 6
20	6 feet ,, ,, ,,	2	17	2	..	57 2 4
20	6·5 feet incandescent ,, ,,	3	1	11	..	61 18 4
1	8 feet gas ,, ,,	2	10	7	..	2 10 7
21	13 feet incandescent ,, ,,	7	12	0	..	159 12 0
2	15 feet gas ,, ,,	7	2	10	..	14 5 8
	Lighting, &c., and maintenance, as per accepted quotation of Gas Company .		—		..	402 0 0
						£1099 14 6

These lamps burn on the 3940 hours per annum scale; and the annual cost is £1099 14s. 6d. The few instances of flat-flame burners now existing are in courts and places where it was thought lamps of the incandescent type would be roughly used.

St. Margaret's

This parish is entirely lighted by gas, and until 1899, the ordinary type was a 5-feet flat-flame burner. During 1899, the late Vestry had under consideration the desirability of improving the lighting; and on June 28, 1899, an agreement was entered into, by which the Gaslight and Coke Company undertook to provide and fix improved lanterns and incandescent burners of the numbers and at the cost respectively set forth in the schedule, in lieu of the existing lanterns, viz. :—

1265	lanterns, burners, levers, chains, governors, and fixing same in position	at £1	19	10	each =	£2519 9 2
88	,, ,, ,, ,,	2	10	8	,,	222 18 8
16	,, ,, ,, ,,	3	1	6	,,	49 4 0
5	,, ,, ,, ,,	5	1	4	,,	25 6 8
11	,, ,, ,, ,,	5	12	2	,,	61 13 10
						£2878 12 4

The contract is for a period of five years from June 24, 1899, determinable by either party at the end of the third year, upon six months' previous notice. The above-mentioned capital cost is to be borne in the first instance by the Gas Company, but repaid by the Vestry by twenty equal quarterly instalments, commencing on Sept. 29, 1899; the Company making no charge for interest on the unpaid instalments. The lanterns were to be fitted with No. 4 Welsbach or other suitable incandescent burners, guaranteed to consume not more than 4·2 cubic feet per hour, with a bye-pass consuming one-third of a foot per hour, with a provision that, so soon as self-lighting mantles could be successfully and legally used, and the bye-passes removed, the charge for bye-pass light should cease. The bye-passes have since been removed. The Company further undertook to light, extinguish, clean and repair, and paint the lamps, and paint and repair the columns for the sum of 18s. per lamp per annum during the first three years, and afterwards at a sum agreed upon by the Company's Engineer and the Vestry's Surveyor. The Vestry further undertook to pay not exceeding one shilling for every new mantle supplied, which in no one year should exceed 8s. per lamp.

At the end of the June quarter, the following lamps were in lighting :

1241	4·2 feet incandescent lamps on scale .	£3	4	0	..	£3971 4 0
52	4·2 feet ,, ,, ,, .	3	7	10	..	176 7 4
1	4·2 feet ,, ,, ,, .	3	13	10	..	3 13 10
54	4·2 feet ,, ,, ,, .	3	10	10	..	191 5 0
24	4·2 feet ,, ,, ,, .	3	6	0	..	79 4 0
19	5 feet gas-lamps on scale.	3	5	7	..	62 6 1
28	5 feet ,, ,, ...	3	7	7	..	94 12 2
1	7 feet incandescent lamp on scale . .	5	9	10	..	5 9 10
3	8·4 feet ,, ,, ,, . .	6	5	9	..	18 17 3
9	8·4 feet ,, ,, ,, . .	7	11	9	..	68 5 9
2	12·6 feet ,, ,, ,, . .	10	1	7	..	20 3 2
2	15 feet gas-lamps on scale	9	14	10	..	19 9 8
1	15 3 feet incandescent lamp on scale .	7	19	7	..	7 19 7
12	16·8 feet ,, ,, ,, .	12	11	6	..	150 18 0
3	30 feet ,, ,, ,, .	15	7	4	..	46 2 0
35	18·48/5 feet special lamps in Whitehall and Parliament Street . . .	5	10	2	..	192 15 10
						£5108 13 6

The whole of these lamps burn on the 3940 hours per annum scale; and the cost per annum as shown is £5108 13s. 6d. An installation consisting of ten of Sugg's high-pressure self-intensifying gas-lamps is fixed in Whitehall, under arrangements made by the late Vestry, which were ratified by the Council in an agreement for maintenance for 3½ years from Midsummer, 1901.

Strand District.

The lighting of the parishes comprised in the late Strand District is entirely by gas: and consists, with few exceptions, of triple flat-flame burners, consuming 15 feet per hour, fixed in Sugg's Victoria lanterns. The tabular matter as to the number, consumptions, and costs of the lamps is too extensive for reproduction. But it may be stated that the total cost per annum is £6552; and the lamps burn upon the 4300 hours scale per annum.

St. James's.

The minor streets of this parish are lighted principally by means of 5-feet flat-flame burners, and at the June quarter consisted of :—

2	3½ ft. incandescent lamps	£2	14	6	..	£5 9 0
6	5 ,, ,, ,, ...	3	7	7	..	20 5 6
7	5 ,, ,, ,, ...	3	8	7	..	24 0 1
509	5 ,, gas lamps	3	2	7	..	1592 14 11
9	7 ,, ,, ...	4	1	8	..	36 15 0
1	7 ,, incandescent lamp	4	14	0	..	4 14 0
10	8 ,, gas lamps	4	11	2	..	45 11 8
31	10 ,, ,, ...	5	10	3	..	170 17 9
10	10 ,, ,, ...	5	13	3	..	56 12 6
1	12 ,, ,, ...	6	12	3	..	6 12 3
1	15 ,, ,, ...	8	2	10	..	8 2 10
1	15 ,, ,, ...	8	0	10	..	8 0 10
3	30 ,, ...	15	15	8	..	47 7 0
8	metered lamps on refuges, &c. (say for one year)		—		..	157 7 10
						£2184 11 2

The gas-lamps burn on the 3940 hours per annum scale, and cost £2184 11s. 2d. per annum. On Nov. 9, 1896, the late Vestry entered into an agreement with the St. James and Pall Mall Electric Lighting Company for the lighting of about 60 lamps. The agreement is for seven years certain; and thereafter at 12 months' notice. The Company have to supply current "not less than 10 amperes of such pressure as to ensure a steady light from sunset to sunrise;" the Gas Company's lighting tables to be taken as a basis. The installation now consists of 66 lamps—65 at £30, and 1 at £27 10s. Payment is made at £30 per 10-ampere lamp per annum, and at 2d. per hour for extra current.

Experimental Lighting.

There are within the City several instances of experimental lighting. A number of incandescent gas-burners are fixed in St. James's Square, Burlington Gardens, and Beak Street; and inasmuch as incandescent

lighting of this type cannot now be regarded as experimental, I would recommend that they be discontinued, unless there is a disposition to extend the system to the remainder of the locality. From my experience of incandescent lighting, I do not hesitate to advise that in all cases where gas is used for street lighting, the incandescent system should be adopted.

The Welsbach Incandescent Gas-Light Company also have a high-pressure installation at Charing Cross, opposite the Nelson Monument, upon the large lamp over the underground lavatories. This experiment consists of three clusters of incandescent burners. The Welsbach Company have written stating that, having given up their maintenance department, they are no longer able to maintain these burners, and requesting the Council to take over this installation, for which they will make no charge. A similar lamp is fixed in the Broadway, Westminster.

Messrs. Sugg and Co. erected for the late Strand District Board an installation of high pressure gas lighting, consisting of nineteen lamps of "Westminster" and "Victoria" patterns; three 10-feet burners in each of the large lamps, and one in each of the small lamps. In some cases the lamps were converted from the flat-flame system to the high-pressure gas lighting; in others, the new lamps were supplied, fitted, and erected complete, together with the high-pressure plant and the necessary services, including the connecting up of the water supplies and the fixing and alterations to the lamps where necessary. The pressure plant is situated at the Council's lavatories in Wellington Street and by the Law Courts. (Incidentally it may be mentioned that the Committee have decided to light the remaining portion of the Strand between the Hotel Cecil and Temple Bar with electric light.)

THE SCALE OF LIGHTING HOURS.

With regard to the scale of lighting hours now in force, as four of the five parishes are lighted upon the basis of 3940 hours per annum, I beg to recommend that the Strand area, now burning at 4300 hours per annum, be reduced to that standard, which gives a good average result. By the use of the longer scale of hours, the lamps are very often alight for some considerable time before darkness sets in, and are burning considerably after sunrise.

COMPETITION FOR THE PARIS GAS SUPPLY.

The Gas Company's Scheme Favoured by the Prefect of the Seine.

In the "JOURNAL" a fortnight ago, reference was made to the keen competition going on in Paris for the privilege of supplying gas to the city at the expiration of the Company's concession in 1905; and an indication was given of the nature of some of the schemes put forward. All the proposals were submitted to the Prefect of the Seine (M. de Selves), and last Tuesday morning he presented his report thereon to the Committee of the Municipal Council who have had the matter in hand. Of the entire number, he selected seven; but, in the opinion of the Municipal Engineers as well as in his own, two of them should be excluded. One of these emanated from MM. Chastel, Champion, and Rousseau, representing the Paris Gas Consumers' Company in course of formation; and the other from M. Raoul Pictet, also representing a company *in embryo*. This reduced to five the number of really feasible schemes worth laying before the Council. The first was that of MM. Devaluez and Duchanoy, already referred to in our columns; the second, that of M. Dehaynin, President and Managing-Director of the French Gas Lighting and Heating Company, acting on behalf of an unformed company; the third, that of M. de Sinçay, who has the support of the Comptoir National d'Escompte; the fourth, that of M. Damour, representing a company in course of formation; and the fifth, that of the existing Company.

The Prefect epitomized these schemes as follows: (1) MM. Devaluez and Duchanoy ask for a concession for 35 years, and offer gas to private consumers at 20 c. per cubic metre up to 1914, and at 15 c. from that year till 1940. The Municipality are to receive 17,000,000 frs. from 1906 to 1914, and 15,000,000 frs. to the end of the term. (2) M. Dehaynin also wishes for a concession for 35 years, with a price of 20 c. per cubic metre up to 1940; the payments to the Municipality rising from 16,000,000 frs. to 21,000,000 frs. (3) M. de Sinçay's proposal is for a concession of 35 years' duration, with a selling price of 18 c. per cubic metre from 1906 to 1922, and 17¾ c. thenceforward. The payments to the Municipality range from 15,000,000 frs. up to 20,000,000 frs. (4) M. Damour proposes a concession for 30 years only; the charge for gas to be 20 c. per cubic metre till 1916, and 19 c. for the remainder of the term. The payments to the Municipality range from 19,000,000 frs. to 21,000,000 frs. (5) The Paris Gas Company ask for only a 20 years' concession, commencing on Jan. 1, 1906; the price to private consumers in the city to be, as now, 20 c. per cubic metre. The Company will pay over to the Municipality amounts ranging from 17,750,000 frs. to 23,100,000 frs., and will undertake to liquidate, during the term of the concession, the loans which it may be necessary to raise at the outset of the new system of working, but not afterwards. On Jan. 1, 1926, the Company will hand over to the City, without payment, the whole of the works and plant. They propose to manufacture coal gas, but they ask to be allowed to mix with it a proportion of oil gas or water gas.

Having given an outline of the schemes, it remained for M. de Selves to express his opinion upon them. This he did in most unequivocal language. He said he had come to the conclusion that the scheme submitted by the existing Company would be the most advantageous one for the Council to adopt. The concession would be for only 20 years, instead of 30 or 35 years, as proposed by the other parties; and if the Municipality came to terms with the Company, they would become the owners, free of charge, of the entire plant, whereby it would be possible to make such arrangements for carrying on the gas supply as might be deemed advisable under the conditions then existing. The only reserve shown by the Prefect in his general commendation of this scheme is in regard to the permission sought by the Company to employ carburetted water gas. In other respects it is, in his opinion, all that can be desired; and, subject to certain modifications, he strongly advises its acceptance.

The Special Committee met last Wednesday, under the presidency of M. Deville, and were engaged for upwards of two hours in discussing the Prefect's report. At the outset, M. Sauton, who for some years has identified himself with the gas question, and devised a plan for its solution, advised his colleagues not to have anything to do with the Gas Company's scheme. He recalled the various disputes which had taken place from time to time between the Company and the Municipality; and he asked that their proposals should be summarily rejected. After some exchange of views on the matter, it was decided that the scheme should have the same consideration as the others. A question then arose as to why the Prefect had not dealt with the subject of the municipal control of the gas supply, no reference to which had been made in his report; and it was resolved to ask him to attend a meeting of the Committee, to be held yesterday, in order that his opinion on this point might be ascertained. It is pretty generally understood that he does not favour direct control—at all events, at present. However, he will doubtless be able to satisfy the requirements of the Committee. It was originally intended to consider the whole subject at a special meeting of the Municipal Council to be held on the 23rd inst.; but the President (M. Escudier) has informed the Prefect that this arrangement will not give the Committee sufficient time to study the report thoroughly. The matter will therefore probably stand over till early next month.

PROPOSED PORTABLE PHOTOMETER FOR GUILDFORD.

The Lighting Committee reported at last Tuesday's meeting of the Guildford Town Council that, under their Act, the Gas Company were only compelled to provide a testing-station, at the gas-works, with the necessary apparatus, where the pressure and illuminating power of the gas might be examined. The illuminating power under the Act must be equal to 15 candles. Dr. Rideal stated that the Act of Parliament was very explicit in naming the interior of the gas-works as the place where testing for quality should be done. He looked upon this as a defect in the Act, as it would be much more satisfactory if the testing took place a quarter-of-a-mile at least away. Dr. Rideal explained that when water gas was manufactured (and it was understood that this was the case at Guildford), a gas was first obtained of good heating power, but inferior illuminating power. To bring water gas up to 15 candles, it was necessary to enrich it with other substances having a high illuminating power; and this would be done before the gas passed through the photometer. But these substances were heavier than the gas, and in going through the pipes would be dropped on the way, just as mud was dropped in a river and dust in the air; so that gas which reached burners at a distance would not be likely to have the same illuminating power as when it left the works. This might account for the bad light so commonly complained of in Guildford, and explain why incandescent burners were indispensable in the street-lamps and elsewhere. The remedy was for the Gas Company to cease supplying water gas for lighting purposes, and give a coal gas that would remain as good to the last as when it left the works. Failing this, it was difficult to see what could be done in the public interest, owing to the faulty way in which the Act had been drawn up. It was possible, by means of a portable photometer, to test the quality of the gas anywhere; and if one was provided by the Corporation at a cost of £45, Dr. Rideal was ready to make the tests—that was to say, on one and the same day he would test the gas at the works and in three or four places in the town, and the Corporation and the public would then be able to compare the results obtained and draw their own conclusions. There would, however, be no power to prosecute on these combined results, but only on the test as carried out at the gas-works. Dr. Rideal would charge £3 3s. for each evening's work, including one, two, or more tests, as time permitted. This fee would be in addition to the amount paid to him under the existing arrangements. On consideration of all these facts, the Committee recommended that a portable photometer be obtained, and that Dr. Rideal be asked to make three outside tests, if possible, in addition to the one inside the works. The Committee also recommended that Dr. Rideal be asked to test as to the presence of carbonic oxide in the gas.

After some discussion, both recommendations were lost—four members voting in favour of them and five against.

Hanley and the Power-Gas Scheme.—At a recent special meeting, the Hanley Town Council decided, by a large majority, to oppose the Bill for the incorporation of the North-Western Electricity and Power Gas Company, the passing of which would, it was believed, be detrimental to the interests of the town, and to its electricity supply undertaking.

Southport Corporation and the Supply of Gas Appliances.—The Gas Committee of the Southport Corporation have decided to take a shop, apart from the offices, for the exhibition of gas stoves, fires, lighting appliances, &c. The show-room is to be kept thoroughly stocked; and all requirements of the public will be met. A complete installation of the different lights in use will shortly be made. At the meeting of the Town Council on Tuesday evening, Mr. Trounson, the Deputy-Mayor and the Chairman of the Gas Committee, said he had received letters from the Ironmongers' Association and Master Plumbers' Association protesting against the proposed taking of a shop for the exhibition of gas appliances by the Corporation. He pointed out that they were labouring under a misapprehension as to the purposes of the shop. The Committee had no desire to encourage what was commonly known as municipal trading. The gas trade had been practically revolutionized during the past few months by the introduction of new burners, and the idea was to exhibit the latest improvements for the benefit of the public.

MELTHAM GAS SUPPLY.

Local Government Board Inquiry.

Last Tuesday, Colonel A. G. Durnford, R.E., held an inquiry, on behalf of the Local Government Board, into an application by the Meltham Urban District Council for a Provisional Order to enable them to purchase, by agreement, additional land for the purposes of their gas undertaking. Mr. F. A. Reed appeared for the Council, and stated that the undertaking of the Meltham Gas Company was acquired by an Order obtained in 1887; and that since then the number of consumers had increased 50 per cent. As a result of this progress, extensions had to be made by putting in a set of seven retorts. The present inquiry was only in connection with the purchase of land of the value of £200; but, inasmuch as the Council would have to ask shortly for power to borrow £6000, it was perhaps as well that particulars should be gone into. The Council had been looking out for a site for the manufacture of gas, and had now found one. This and the boundary wall would cost £238 17s.; a new gasholder tank, £1600; a gasholder, £960; mains, £1300; retorts, £300; and gas stoves and meters, £1000—the incidental expenses bringing up the total to £6000. The Clerk to the Council (Mr. W. Carter) corroborated these figures. Mr. J. H. Brearley, of Longwood, the Consulting Gas Engineer to the Council, said that in 1901, when he was called in, not more than 60,000 cubic feet of gas could be produced per day, and the demand was for this quantity. In 1902, consumers were subjected to shortage in supply on several occasions, and it was necessary that more retorts should be put up. The present gasholder was not adequate for the demand. It had a capacity of 12 hours' supply in the middle of winter, whereas in his opinion it ought to be equal to not less than 36 hours' supply—in fact, there were few works of the size which had less. The new site was 502 feet, and the old works were 547 feet, above the sea level. Mr. Brearley proceeded to give details of the work proposed to be carried out, which showed that there would be a maximum storage capacity of 37 hours' supply. Mr. Carter, in reply to Mr. Reed, said that in 1889 the quantity of gas sold was 6,130,000 cubic feet, and the capital was £8000, which gave £1 6s. 1d. capital per 1000 cubic feet sold. For the year ending March 31 last, the quantity sold was 9,866,000 cubic feet, and the capital was £2493, which gave 5s. 9d. capital per 1000 feet Assuming the sum of £6000 was borrowed, it would bring the capital up to £8473, and taking the gas sold at 10 million cubic feet, it would give a capital of 16s. 11d. per 1000 feet, or 9s. 2d. less than on the original capital.

The Burnham Gas Company are going in for a large extension scheme, estimated to cost over £2000. The work includes a 9-inch main, gasholder, exhauster, and tar-tank. Mr. J. H. Cornish, of Bridport, is the Engineer.

THE QUESTION OF MUNICIPAL TRADING.

Address by Mr. Balfour Browne, K.C.

A short time ago, Mr. Balfour Browne, K.C., delivered an address on the above subject at the Mechanics' Institute in Dumfries (his native town). As the learned gentleman has been associated with the promotion of many works which have largely affected the lives of great communities, we reproduce those portions of his discourse which bear most directly upon matters of interest to our readers.

I am always proud to say that I acted as one of the Counsel for the promoters of the Bill which allowed the Corporation of Manchester to collect the waters of Thirlmere, and to carry 50 million gallons of water a day through 100 miles of pipes to that great city. I also acted for the Corporation of Birmingham when they obtained parliamentary powers to carry the waters of two crystal rivers of Wales 80 miles away, into that grimy hive of industry the Black Country. I was one of the Counsel for the Bill which enabled a company to construct the Manchester Ship Canal—a project which, although it was begun by a company, was completed by means of £5,000,000 of money which was secured by the rates of Manchester—which made a road for ocean steamers 35 miles into the country, and turned a large inland town into a seaport, where to-day an export and import trade of 14,901,401 tons is done, which compares not unfavourably with the trade of Glasgow (an older port) of 13,971,183 tons. These are some illustrations of the works on which I have been engaged, and you will not wonder that I have thought it worth while to say something of the duties of municipalities, and as to the important question as to how far our town authorities ought to be allowed to undertake enterprises in the nature of trade. Let me say at once that many of the enterprises which have been undertaken by our local governing bodies have been excellent, and that up to the present time, so far as I can see, no harm has been done by the transfer to corporate hands of many of the great undertakings which minister to the comfort and well-being of the community. At the same time, there has recently been a scare as to Municipal Socialism; and it is worth while looking into some matters connected with the proper functions of governing bodies.

I do not know that there is any more remarkable change in the social life of the community than that which has taken place with regard to water. At one time its uses were mainly confined to cooking and dietetic purposes, when nothing better offered. To-day, however, it is used not only as the carrier of sewage, but it is lavishly employed for washing, and a great majority of houses are fitted with baths. For a long time this matter of water supply was in the hands of companies; but, as time went on, undertakings which had been in the hands of companies came into those of municipal authorities. The last one in Scotland was transferred to a Water Board representative of Airdrie and Coatbridge and the district about a year ago; and I was in at the

GAS AND WATER COMPANIES' STOCK AND SHARE LIST.

Referred to on p. 407.

Issue.	Share.	When ex-Dividend.	Dividend or Dividend & Bonus.	NAME.	Closing Prices.	Rise or Fall in Wk.	Yield upon Investment.
£			p.c.	GAS COMPANIES.			£ s. d.
590,000	10	Oct. 15	10½	Alliance & Dublin 10 p.c.	18½—19½	..	5 7 8
100,000	10	,,	7½	Do. 7 p.c.	12⅜—13½	..	5 11 1
200,000	5	Nov. 13	6⅛	Bombay, Ltd.	5⅜—6⅛	..	5 4 0
40,000	5	,,	6½	Do. New, £4 paid	4⅜—4⅝	..	5 9 5
380,000	Stk.	Aug. 14	12	Brentford Consolidated	247—252	..	4 15 3
286,700	,,	,,	9	Do. New	182—187	..	4 16 3
50,000	,,	,,	5	Do. 5 p.c. Pref.	136—141	..	3 10 11
206,250	,,	Dec. 11	4	Do. 4 p.c. Deb.	110—113	..	3 10 10
220,000	Stk.	Sept. 11	10½	Brighton & Hove Orig.	209—214	..	5 0 4
246,320	,,	,,	7½	Do. A. Ord. Stk.	155—160	..	4 16 11
460,000	20	Sept. 26	10	British	39½—40½	..	4 18 9
50,000	10	Aug. 14	12	Bromley, Ord. 10 p.c.	—	..	—
82,850	10	,,	9	Do. 7 p.c.	—	..	—
500,000	10	Oct. 15	7	Buenos Ayres (New) Ltd.	10½—11	+½	6 7 3
250,000	Stk.	Dec. 30	4	Do. 4 p.c. Deb.	92—94	..	4 5 1
150,000	20	July 11	8½	Cagliari, Ltd.	23—25	..	6 12 0
100,000	10	Sept. 26	10	Cape Town & Dis., Ltd.	15—16	..	6 5 0
50,000	50	Nov. 3	6	Do. 6 p.c. 1st Mort.	53—55	..	5 9 1
1,375,000	Stk.	—	5†	Commercial 4 p.c. Stk.	107—110	+1	4 10 11
503,750	,,	—	4½†	Do. 3½ p.c. ,,	101—104	..	4 11 4
407,812	,,	—	3	Do. 3 p.c. Deb.,,	90—93	..	3 4 6
800,000	Stk.	Dec. 11	8	Continental Union, Ltd.	125—130	..	6 3 1
200,000	,,	,,	7	Do. 7 p.c. Pref.	140—145	..	4 16 7
575,000	Stk.	Aug. 28	5⅜	Crystal Palace Ord. 5 p.c.	117—122	..	4 7 4
60,000	,,	,,	5	Do. 5 p.c. Pref.	120—125	..	4 0 0
106,158	,,	Jan. 15	5	Do. 5 p.c. Deb. Stk.	137—140	..	3 11 5
486,090	10	Jan. 29	10½	European, Ltd.	17⅛—18½	..	5 13 6
354,060	10	,,	10⅝	Do. £7 10s. paid	13—14	..	5 12 6
15,243,200	Stk.	Feb. 12	4⅜†	Gas-light and Coke	4 p.c. Ord.	83—85*	..	5 3 6
2,600,000	,,	,,	3½		3½ p.c. max.	86—88*	..	3 19 7
3,799,735	,,	,,	4		4 p.c. Con. Pref.	106—109*	..	3 13 5
4,193,975	,,	Dec. 11	3		3 p.c. Con. Deb.	91—93	..	3 4 6
252,500	Stk.	Sept. 11	5	Hastings & St. L. 3½ p.c.	90—95	..	5 5 3
70,000	10	Oct. 30	8	Hongkong & China, Ltd.	14½—15½	..	5 3 3
3,800,000	Stk.	Nov. 13	10	Imperial Continental	206—209	..	4 15 8
473,600	Stk.	Feb. 12	3½	Do. 3½ p.c. Deb. Red.	98—101*	+1	3 9 4
158,242	Stk.	Aug. 28	6	Lea Bridge Ord. 5 p.c.	115—120	..	5 0 0
561,000	Stk.	Aug. 28	10	Liverpool United A	224—226	..	4 8 6
718,100	,,	,,	7	Do. do. B	165—167	..	4 3 10
306,083	,,	Dec. 31	4	Do. do. Deb. Stk.	114—116	..	3 9 0
75,000	5	Dec. 11	5	Malta & Medn., Ltd.	4¼—4¾	+⅛	5 5 3
560,000	100	Oct. 1	5	Met. of 5 p.c. Deb.	105—109	..	4 11 9
250,000	100	,,	4½	Melbourne 4½ p.c. Deb.	103—105	..	4 5 9
541,920	20	Nov. 13	3½	Monte Video, Ltd.	9¾—10¾	..	6 13 4
1,515,892	Stk.	Aug. 8	4½	Newc'tle & G'tesh d Con.	104½—105½	..	4 5 4
346,855	Stk.	Jan. 2	3⅜	Do. 3⅜ p.c. Deb.	97—98	..	3 11 5
300,000	Stk.	Nov. 27	8	Oriental, Ltd.	143—148	..	5 8 1
600,000	5	Sept. 26	7	Ottoman, Ltd.	6—7	..	5 0 0
					* Ex. div.		

Issue.	Share.	When ex-Dividend.	Dividend or Dividend & Bonus.	NAME.	Closing Prices.	Rise or Fall in Wk.	Yield upon Investment.
£			p.c.	GAS COMPANIES.			£ s. d.
105,005	Stk.	Jan. 15	6⅛	Ply'mth & St'house 5 p.c	123—128	..	4 15 9
851,070	10	Oct. 15	7	River Plate Ord.	10¾—11	..	6 7 3
300,000	Stk.	Dec. 30	4	Do. 4 p.c. Deb.	93—95	..	4 4 3
250,000	10	Sept. 26	8	San Paulo, Ltd.	11½—12½	..	6 8 0
135,000	Stk.	Sept. 11	10	Sheffield A	236—238	..	4 4 0
209,984	,,	,,	10	Do. B	234—236	..	4 4 9
523,498	,,	,,	10	Do. C	233—235	..	4 5 1
103,235	Stk.	Sept. 26	5	Shrewsbury Ord. 5 p.c.	113—116	..	4 6 2
6,000,000	Stk.	Feb. 12	5⅛	South Met., 4 p.c. Ord.	119—121*	..	4 8 2
1,780,000	,,	Jan. 15	3	Do. 3 p.c. Deb.	91—93	..	3 4 6
380,940	Stk.	Nov. 13	5	Southampton Ord.	103—107	..	4 13 6
87,950	,,	Jan. 15	4	Do. 4 p.c. Deb.	100—103	..	3 17 8
120,000	Stk.	Aug. 28	6	Tottenham and Edmonton A. 5 p.c.	118—123	..	4 17 7
300,520	,,	,,	4½	Tottenham and Edmonton B. 3½ p.c.	93—96	..	4 13 9
182,380	10	Dec. 30	5	Tuscan, Ltd.	8½—9½	..	5 5 3
149,900	10	Jan. 2	5	Do. 5 p.c. Deb. Red.	94—96	..	5 4 2
752,552	Stk.	—	—	West Ham, 5 p.c. Ord.	97—102	..	—
				WATER COMPANIES.			
780,662	Stk.	Dec. 30	11⅛	Chelsea, Ord.	315—325	..	3 10 9
150,000	,,	,,	5	Do. 5 p.c. Pref.	150—155	..	3 4 6
160,000	,,	,,	4½	Do. 4½ p.c. Pref. '75	138—143	..	3 2 11
175,785	,,	Sept. 26	4½	Do. 4½ p.c. Deb.	140—145	..	3 2 1
1,720,560	Stk.	Oct. 15	8	East London, Ord.	228—233	..	3 8 9
654,740	,,	Dec. 11	4½	Do. 4½ p.c. Deb.	142—147	..	3 1 3
1,282,943	,,	,,	3	Do. 3 p.c. Deb.	97—99	..	3 0 7
700,000	50	Dec. 11	8	Grand Junction 10 p.c. max.	117—122	..	3 5 7
310,000	Stk.	Sept. 26	4	4 p.c. Deb.	125—130	..	3 1 7
708,000	Stk.	Aug. 14	14	Kent	305—315	..	4 8 11
160,000	,,	,,	7	Do. New, 7 p.c. max.	200—210	..	3 6 8
1,043,800	100	Dec. 30	11	Lambeth, 10 p.c. max.	305—315	..	3 9 10
406,200	100	,,	8½	Do. 7½ p.c. max.	220—230	..	3 13 11
350,000	Stk.	Sept. 26	4	Do. 4 p.c. Deb.	125—130	..	3 1 7
500,000	100	Feb. 12	12⅛	New River, New Shares	390—400*	+1½	3 4 0
1,000,000	Stk.	Jan. 29	4	Do. 4 p.c. Deb.	125—130	..	3 1 7
902,300	Stk.	Dec. 11	7	Southwark and Ord.	207—212	..	3 6 0
126 500	100	,,	7	7½ p.c. max.	200—210	..	3 6 8
489,200	Stk.	,,	5	5 p.c. Pref.	151—154	..	3 4 11
1,019,585	,,	Oct. 15	4	Vauxhall 4 p.c. A Deb.	125—130	..	3 1 7
1,155,066	Stk.	Dec. 11	10	West Middlesex.	295—305	..	3 5 7
200,000	,,	,,	4½	Do. 4½ p.c. Deb.	140—145	..	3 2 1
200,000	,,	Sept. 11	3	Do. 3 p.c. Deb.	97—99	..	3 0 7
					* Ex. div.		

† Next dividend will be at this rate.

death. And those great commercial undertakings, the eight Water Companies of London, are, as you are aware, to be placed in the hands of a public representative body under the Government Bill which passed last December. Most people would admit that there was a great deal to be said for placing water supply as well as main drainage in the hands of municipalities. Water supply is closely connected with sewage disposal. It is not paid for by the quantity taken, but by a rate, in the nature of a tax. It is largely used for public purposes, such as the extinguishing of fire and the watering of streets; and it ought to be made as cheap as possible. Its use should be encouraged, and not discouraged; and there is every chance that, in public hands, which are not working for a profit, water will be cheaper than in private hands, to which dividends are a matter of importance. If the public do not, by municipal management, obtain dividends in money from these enterprises, I think it is certain that they receive large dividends in decency and in health from the abundant waters which are passing through and cleansing our great towns.

But although up to this point no loud protests have been raised by those who object to municipal trading, they begin to be heard against the municipalizing of all our institutions. A considerable number of persons who probably have capital to invest, at greater rates of interest than 3 per cent., want to have all the good things reserved for private enterprise; and, therefore, they protest against any of the remunerative undertakings getting into public hands. This attitude of capitalists—a class for which I have an inordinate admiration—is not unlike that of a certain class of politicians in relation to Free Trade. The imposition of taxes on imports, which have to be paid by consumers, plays into the hands of home producers. And in these high matters we are dealing with, the prevention of the enterprise of municipal corporations in gas, electricity, and tramways is all in favour of those commendable gentlemen who have money to invest and do not want all the doors of their Stock Exchange barred by the public. Now, here we are really face to face with the great problem.

I have a great admiration for sewers; but there is another common institution—mostly muddy—for which I have as profound an admiration, and that is roads. I think roads were the most important invention I have seen in the great patent office of history. They have been to nations what nerves are to a human body. Being in the hands of authorities, the making them useful at night was an obvious and necessary advance. How was this to be done? By lighting them. Now, when gas was invented and used by the public, it was clear that the road authorities were right in adopting it for public lighting in populous places. But it would obviously have been absurd to allow of the lighting of houses along a street to be in private hands, and the lighting of the public lamps in those of the town council. The result was inevitable. Town councils became the owners of gas-works, and began to trade in gas—an article which was paid for like bread over a counter, and not like water by a rate. And, further, to-day we find some municipalities doing all the plumbing work in the houses of the citizens, and supplying all the gas-fittings, which is a very questionable advance in the direction of municipal trading. I have been concerned with dozens of Bills by which gas undertakings have been transferred, against the will of the proprietors, to the hands of municipal authorities or district councils. Whether this was right or wrong, I at this stage express no opinion; but it is a matter that makes the hair of private enterprise stand on end.

Before I enter upon some of the objections to municipal trading—and some of them are cogent—let me say I think that up to the present time our municipalities have done most excellent public service in every one of the directions I have been indicating. Their water undertakings make the great works of Rome look foolish and trivial; their tramways are carrying millions of persons; their electric installations are in many cases excellent. Indeed, I have no fault to find with the way great towns have done their work. But some persons, having observed how the functions of municipal government have been growing, have begun to ask: Where are we to stop? And if we are not to stop at all, are we not on the quick descent into Socialism, which is a system which aims at the whole of the means of the country—the whole of the means of production and distribution, whether railways, shops, or what not—being the property of the State? Are we prepared to advocate a system which declares private property to be a crime, and which would hand over all property into collectivist hands, making the State the sole proprietor of all kinds of property? I do not think any of my hearers propose to go so far; but it is only fair to say that so rapid has been the growth of municipal enterprise in this country—it is really more rapid than in America—that it has made many persons think that this approach towards Socialism has gone too far. There is, therefore, a strong feeling that a Canute is wanted to say, "Thus far, and no farther," to the tide which is sweeping in; and "The Times" has been preaching the new doctrine that we must tie the hands of our corporations. Let me give you some illustrations to show that the fears of these persons are not without foundation. You will remember that two or three years ago coal went up to a famine price. One of the great corporations having a large coal bill to pay—for they manufactured their own gas and electricity—found that the profits from these sources must go down. What did they propose to do? They introduced a Bill into Parliament to enable them to buy and work a coal pit. This is a straw, but it shows which way the wind blows. Again, a few months ago, I went over the gas-works of one of the large towns in England. They were model works, and the able Engineer who showed me over had every reason to be proud of them. One of the departments, however, struck me as being curious. Close to the gas office, in one of the principal streets of the town, the Corporation had a shop where they sold gas and electric fittings, and from which they sent out men to do the necessary plumbing work in the houses of the consumers. This raises a very important question. Are we to have no more tradesmen in our towns? Is all the work these have done in the past to be done in future by servants of the corporation?

This question is a practical one. Many corporations are already public-house proprietors, and are managing these through their own

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servants; and some have already acquired homes for inebriates—although I hope the one is not the corollary to the other. For example, the London County Council are spending £20,000 on such an institution at Horley. The town of Hull has a municipal crematorium which cost £3100. It is not doing a large trade, however, for in one year the total number of cremations was only 17; but the Corporation are seeking to popularize the crematorium by erecting an ornamental rockery in which 1000 urns for ashes are to find a suitable and picturesque resting-place. But there are other illustrations of the same tendency on the part of corporations. The ratepayers of Manchester benefit to the extent of £15,000 a year from the Corporation markets. In Liverpool, the town rates are relieved to the extent of £14,000 a year from a similar source. At Cardiff, they have a municipal fish market. Brighton owns a racecourse and an aquarium. West Ham makes and sells paving-stones. At Sheffield, not long ago, it was proposed by the Tailors' Union that the Corporation should start a municipal tailoring department. Glasgow has its own telephones, which compete with the telephones of the National Telephone Company; Southborough has a municipal theatre; Nottingham a municipal aviary; Leeds has concerts, and Harrogate has fireworks; Blackpool advertises itself at all the railway stations; and St. Andrews has golf links. I think those who hear me will, while acknowledging what we owe to corporations, agree that the country will be healthier and happier if private enterprise is still allowed to carry out much of the work which has hitherto devolved upon it, instead of putting an end to Individualism in the country, and abolishing from our towns all but the servants of the State or the municipality.

We none of us like the rate collector. The regularity of his calls and the persistency of his demands are provoking to our desultory methods. But the rates are at the present time a very serious factor, which we must reckon with. The carrying out of all these municipal enterprises involves the borrowing of large sums of money, and as many of the operations of corporations are not directly remunerative, the rates in our towns are going up and up. I know one town where they are at present 10s. in the pound, and that is a very heavy burden upon the ratepayer. The burdens of debt which are being borne by the towns of this country are enormous. The total municipal debts are now about £300,000,000; and while the nation is on the up-grade of prosperity, they are not, large as they are, intolerable. If, however, we once turned the hill summit and began to go down the slope of adversity, these debts would be a serious menace to the financial state of the country. I think, in this connection, it is obvious that, while it is wise and right that municipalities should incur debts for such essential matters as sewage disposal, street improvements, and water supply, they should be prevented from entering upon speculative undertakings, in which the gains may be great in the case of success, but in which, in the case of failure, the disaster would be deplorable. I think fair competition is the fresh air of trade. But I do not think that it is fair competition for a corporation, with the rates behind it, to compete in the open market with a private individual. In all contests, the candidates ought to start fair; and in this contest between municipal capital and private traders' capital, the start is eminently unfair. If the trader fails, he fails, and cannot look to his rival for help, unless he has fallen to the level of the workhouse. If the corporation fails, it only increases the rates on its rivals, the traders, which, to my thinking, is unjust. So, while I am in favour of putting many things into municipal hands, I would not allow corporate bodies to compete with private traders, even if it could be shown that they could manufacture the article or sell the goods a little cheaper.

There is a small matter which I should like to mention which seems to me not unimportant, although it only relates to the keeping of accounts. I think all corporations who enter into any of such enterprises as those to which I have been referring should be made to keep separate accounts in relation to each of the matters in which they are engaged. I think it is absolutely necessary that the ratepayers should be able to see whether the particular enterprise is conducted at a profit or at a loss. At the present time, this is not the way in which corporate accounts are kept in many instances; and several of the enterprises of these bodies, which are really an unprofitable burden on the ratepayers, are made to appear as if they were valuable assets. I think again that, when profits are made by a corporation, they ought to be placed to the credit of the consumers of the article produced; and that they ought not to be, as is so often the case, carried to the credit of the ordinary ratepayer by relieving him of rates. Why, for instance, the consumer of corporation gas should pay more for his gas, and the man who has to pay for a street improvement should pay less for that than he otherwise would, I cannot see. I think the system of transferring profits to the relief of rates is a pernicious one. It was a sound principle of Liberalism—now almost an extinct animal—that the men who pay the rates should know the purpose for which they are taxed, and the destination of the money which is raised by taxation. If this knowledge is not in their possession, public control over its representatives is a farce; and in order that public control may exist, it is, in my view, essential, not only that the accounts should be explicit, but that the profits of one enterprise should not be used for the purpose of deceiving the public as to the losses of another.

I have come to the conclusion that, with these limitations, we may trust our municipal institutions, if—and here is a very big "if," for, after all, institutions are made up of human beings, and the faults of the men and women who constitute them come out—we have corporations worked by honest, public-spirited men, as I think they have been in most instances in the past. If you have this, you will find that the operations of these bodies will be honest and public-spirited too. If, on the other hand, you find the corporations worked by men who pretend to be servants of the public, while they are in reality only thinking of private ends—men who have, in the cant phrase, "axes to grind"—then it is inevitable that corporations will do ill service for the public. We must, above all things, prevent our corporations from becoming corrupt. We are all in one boat, and it will not do to allow others to pull the oars while we rest content or merely criticize.

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NOTES FROM SCOTLAND.

From Our Own Correspondent.

Saturday.

The decision recently come to by the Airdrie Town Council to adopt the Burghs Gas Supply (Scotland) Act, 1876, in order to enable them to purchase the undertaking of the Airdrie Gas Company, was the subject of a conference last Monday evening between the members of the Council and some objecting ratepayers. The Council appear to have reckoned without their Coatbridge neighbours, for, according to a letter read by the Town Clerk from Mr. T. Wilson, the Secretary to the Gas Company in that town, Airdrie is within the Company's area; and, as they are incorporated by an Act passed in 1877, the Council are debarred, under the provisions of the Act of 1876, from supplying gas within that area. The Town Clerk expressed some doubt as to whether the Company's Act superseded the General Act, and said he thought Counsel's opinion should be taken on the point. Eventually the conference was adjourned, and the Council decided to ask the Coatbridge Company if it was their intention to come to Airdrie, and to await their reply before moving further in the matter.

The Special Committee of the Falkirk Town Council who have been considering the subject of how to maintain the gas supply have prepared their report. They have come to the conclusion that there is need for new gas-works, and that their erection should be begun as soon as possible It is suggested that Mr. T. Wilson, of Coatbridge, should be appointed Consulting Engineer.

The Hamilton Town Council on Tuesday considered the recommendation of the Gas Committee that approval be given to the proposal of the Caledonian Railway Company to make a siding into the gas-works. The Railway Company are promoting a measure for the improvement of their lines in the Hamilton district; and as the new lines will come within reach of the gas-works, it is thought desirable to have them directly connected with the railway system. By doing so, it is estimated that there will be an annual saving of £400 upon the cost of carting. There was opposition to the proposal, not upon its merits, but because a level crossing will have to be made over a street, involving a traverse of the thoroughfare by railway traffic for a distance of about 140 yards. The Council approved of the scheme by nine votes to six.

At the meeting of the Arbroath Town Council this week, the Manager (Mr. A. C. Young) submitted the report which he had been authorized to prepare with regard to the alteration of the machinery and plant of the gas-works, with an estimate of the cost of new exhausters and engine in duplicate, scrubbers and pumps, &c., and boiler. Mr. Young suggested that the following plant should be obtained: Two exhausters and engines, for 40,000 cubic feet per hour, with governors, bye-pass, connections, foundations, &c., complete; tar, ammonia, and water pumping engines, with foundations and connections, complete; rotary scrubber, with bye-pass, valves, and connections, tar trough and pot, engine, foundations, complete, capable of dealing with a million cubic feet per diem; Cornish boiler (24 ft. by 6 ft. 6 in.), including all fittings, donkey pump, injector, foundations, and flues, including the cost of shifting boiler to a new position and rebuilding same; filling old tower-scrubbers with boards, and altering liquor pipes; underground ammonia store-tank for 18,000 gallons, built of brick and cement; 15-inch cast-iron main-pipes, and connecting the same; tar overflow-piping, connections to pumps, steam-pipes from boilers, excavations, including the removal of old plant and taking down and rebuilding walls, &c.; gas-engine to drive screwing-machine lathes, &c., including shifting of shafting and drilling machine, &c. The total cost, allowing 10 per cent. for contingencies, he set down at £2000. The Manager also stated that he reserved in the meantime making any recommendation in regard to the retort-house roof, preferring to delay for a few weeks expressing an opinion as to whether it could be repaired or whether a new roof must be erected. If the latter should be decided on, it would probably be deemed advisable to heighten the walls at the same time, so as to make the building more agreeable for workers. If the roof could not be repaired, a very considerable additional expense would have to be incurred. The Committee, in order to give full time for the consideration of the Manager's report and recommendations, agreed to adjourn deliberation thereon till next meeting. Provost Grant said the Manager was overhauling the works and making suggestions as to improvements; but everything he proposed would be put before the Council. The action of the Committee was approved.

The Gas Committee of the Perth Corporation had before them on Wednesday the proposals of the Manager (Mr. W. B. M'Lusky) for the better equipment of the gas-works. They met in the works, where Mr. M'Lusky was able to point out how the improved plant would fit in. The cost he estimates at £2000; but he expects that in a few years the whole outlay will be returned through the saving which will be effected by, among other things, his being able to use dry coal. At present, coal is sometimes used in a very wet condition. The Committee approved of what Mr. M'Lusky proposes, and resolved to recommend the Town Council to adopt the scheme.

A few years ago, the Corporation of Edinburgh assumed the duty of lighting all the common stairs in the city and charging for the light by a rate. Previously the Corporation required the inhabitants of tenements which are served by common stairs to light them at their own expense. The Cleaning and Lighting Committee of the Council have prepared and submitted a report, showing (1) the number of common stairs in the city in which there are two or more gas-lights, and (2) the number of common stairs with six or more tenants in which there is only one gas-light, and what the extra cost would be to provide an extra light in all such stairs. The report stated that the total number of stairs lighted by the Corporation was 6091, covering 9965 jets. Of these, 2917 stairs had from two to nine jets, and 3174 had one jet. The number of jets in stairs to the same number of tenants was not uniform; the one principle guiding the department was to light so as to ensure

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public safety. In no case are there fewer jets in any stair than were there when direct payment was made, previous to the cost of stair lighting being put on the public rates; but in numerous instances the number has been increased. The annual cost of a stair light is 17s. 10¾d., apart from the cost of the fittings, which falls on the proprietors. The introduction of a second light in stairs at present with one would involve an additional expenditure of £2840. If, besides doubling the lights in one-jet stairs, additional burners were given in some of those having more than one, the extra cost would not be less than £3500. No action was taken on the report.

In the report of the Directors of the Clippens Oil Company, recently issued, it was stated that the litigation which the Company had had with the Edinburgh and District Water Trust had cost the ratepayers £150,000, and there was foreshadowed a claim of £400,000 as damages for enforced cessation of business. The statement was taken notice of by Sir Andrew M'Donald at a meeting of the Water Trustees on Thursday. He said there was no truth in it. There had been litigation between the Trust and the Company, about mineral rights, since 1886. The whole of the expenses incurred in the seventeen years since then had amounted to £8601. The Company claimed £39,000 for a portion of their minerals. The subject went to arbitration; and the Company were awarded £12,997, or £26,003 less than they asked. If the total amount of expenses were deducted from this sum, it would be found that the Trust were still the gainers by £17,402 by refusing to yield to the Company's demand.

With reference to the particulars of a fire in the plating department of the Gothic Works, Falkirk, which appeared in last week's "Notes," Messrs. R. & A. Main, Limited, write to say that the report was inaccurate. The damage done amounted to about £1000, which is fully covered by insurance—not £3000, partly insured, as stated in the paragraph referred to.

CURRENT SALES OF GAS PRODUCTS.

LIVERPOOL, *Feb.* 14.

Sulphate of Ammonia.

The market has been quiet throughout the week; and prices are easier at all points, except at Leith, where supplies are scarce and where £12 15s. per ton is now quoted. The closing quotations f.o.b. Hull and Liverpool are £12 10s. and £12 12s. 6d. per ton. Those who have contracts to cover seem to be waiting; and the slackening in demand has discovered larger supplies in some quarters than was anticipated, and there has been a certain amount of reselling. The forward position has been neglected; makers sticking to their prices and buyers being unwilling to pay them.

Nitrate of Soda.

The German market for this article has improved, and prices have come more into line with those at French and U.K. ports. Spot quotations remain 9s. 1½d. to 9s. 3d. per cwt., according to quality.

LONDON, *Feb.* 14.

Tar Products.

The markets are quiet, and there is not much business doing. Pitch is certainly easier as regards prompt delivery; consumers' demands being evidently supplied for the time being. There is, however, a fairly good demand for forward delivery, although, of course, at lower prices than those ruling for prompt. Benzol remains steady. Business is reported at 10d. f.o.b. London, but only to a limited extent, and for special quality, 9½d. being the market price at outports. In 50-90 per cent., there are sellers at 8½d. for prompt, but consumers offer only 8d., at which business is impossible for the present. The position of creosote remains about the same. There is certainly more offering in the North; but in London the demand for export continues fairly good, although prices are a shade easier than during last month. Solvent is very depressed; and there is no business to report. There are inquiries for toluol at from 7½d. to 7⅝d., but business does not appear to have resulted. Crude carbolic remains in a very depressed state. 1s. 6d. is reported to have been accepted, in more than one instance, for 60's at outports by dealers, although makers quote 1s. 6⅛d. to 1s. 7d. Crystals are steady. Makers are not pressing sales; evidently being well sold for the present. The position of anthracene remains unchanged.

The average values during the week were: Tar, 22s. 6d. to 27s. Pitch, London, 58s. to 60s.; east coast, 56s. to 57s. 6d.; west coast, 55s. to 56s. Benzol, 90 per cent., 9⅛d. to 9⅜d.; 50-90 per cent., 8d. to 8⅛d. Toluol, 7d. to 7⅛d. Crude naphtha, 3⅛d.; solvent naphtha, 8⅛d. to 9⅜d.; heavy naphtha, 9d. to 10d. Creosote, London, 1½d. to 1⅝d.; North, 1¼d. to 1⅜d. Heavy oils, 2d. to 2⅛d. Carbolic acid, 60 per cent., 1s. 6d. to 1s. 6½d. Naphthalene, 35s. to 55s.; salts, 25s. to 27s. 6d. Anthracene, "A" quality, 1½d. to 1¾d.; "B" quality, 1d. nominal.

Sulphate of Ammonia.

The market continues firm; and there is no alteration of any importance to advise. The Gaslight and Coke Company are quoting £12 12s. 6d. f.o.b. March, but would accept £12 10s. for March-April, and £12 7s. 6d. for May-September. In Hull, sales have been made at £12 10s. prompt, and the same price would no doubt be paid for March. In Leith, the position remains unchanged; and there is a good demand for early shipment. In Liverpool, sales are reported at from £12 10s. to £12 11s. 3d. for prompt, but business is limited at this place.

In the matter of tar prices, Mr J. E. C. Lord, of the Ship Canal Tar-Works, Weaste, Manchester, writes: "The prices which are being realized for tar have for some considerable time been more than are shown in your 'JOURNAL' for the top prices. I give you the prices paid during the last four months: October, £1 10s. 5d. per ton; November, £1 12s. 2d.; December, £1 13s. 7d; January, £1 16s. 6d."

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COAL TRADE REPORTS.

Lancashire Coal Trade.

Generally, only an indifferent sort of demand continues to be reported throughout the coal trade of this district, and many collieries are not working more than 4 to 5 days per week, with supplies, notwithstanding the restricted output, ample to meet all requirements. The house-fire coal trade remains exceptionally quiet for the time of the year; the better qualities of round coal hanging at collieries and accumulating slightly in stock, but chiefly under load in waggons on the pit sidings. Special clearance lots are offered at temporary cut prices; but the general pit quotations remain unchanged, and for the most part steady at about 15s. to 15s. 6d. per ton for best Wigan Arley, 12s. 6d. and 13s. to 13s. 6d. for the commoner sorts of Arley and Pemberton four feet, and 10s. and 10s. 6d. up to 11s. 6d. for the commoner sorts of house-fire coals. The lower descriptions of round coal are also beginning to hang upon the market, partly through lessened requirements for common house-fire consumption, and a slackening off in the shipping trade, with the result that supplies are getting more plentiful for iron making, steam, and general manufacturing purposes. Requirements show no appreciable increase; but on inland sales, there is no material giving way upon late rates. Ordinary qualities of steam and forge coal average 8s. 3d. to 8s. 6d. per ton, with the better qualities quoted about 9s. to 9s. 3d. at the pit. The quietude in the house-fire coal trade tends to lessen the production of slack; but notwithstanding this, the supplies on the market are more than sufficient to meet requirements, and from outside districts surplus supplies are again being pushed for sale at low figures. Best qualities of Lancashire slack are maintaining late rates at about 6s. 6d. to 7s. per ton at the pit. In the medium and commoner sorts, there is increasing competition; but quotations can scarcely be given below last week. Common slacks average 4s. 3d. to 4s. 9d. per ton at the pit, and good medium sorts 5s. 3d. up to 5s. 9d. In the shipping trade, some very low prices have been ruling for common qualities of steam coal, which could be bought at about 9s. 6d. to 10s. per ton, with the better qualities quoted 10s. 3d. to 10s. 6d., delivered at the ports on the Mersey.

Northern Coal Trade.

There is now a reduction in the demand for coals; and the fixing of one or two of the yearly contracts shows that the prices are in some cases a little lower. Best Northumbrian steam coals are from 10s. 9d. to 11s. per ton f.o.b., for second-class coals the price is from 9s. 9d. to 10s., and steam smalls are 5s. 6d. to 5s. 9d. The collieries are still fairly well employed; but much less coal is being sent to the United States at present, and this gives less pressure in the demand. The settlement of the large contracts for coal for the Swedish State Railways shows that it is expected that the prices over the season will be about 6d. per ton below those of a year ago. For gas coals, the quotation is not so much changed; but the demand is a little less. Best Durham gas coals for occasional cargoes are about 9s. 6d. to 9s. 9d. per ton f.o.b. The tenders have now been sent in for some 95,000 tons of gas coals for Stockholm; and it is supposed that the prices may be 1d. or 2d. per ton below those for the past year's contracts. Gas coke is without alteration.

Scotch Coal Trade.

Though change cannot be observed yet, there is a presentiment that we are on the eve of a further drop in prices. Several reasons might be given for this belief, the principal of which is the activity of German coalowners. Meantime, the output is being taken up. The prices quoted are: Main 9s. to 9s. 3d. per ton f.o.b. Glasgow, ell 9s. 6d. to 10s. 3d., and splint 10s. 6d. to 11s. The shipments for the week amounted to 201,874 tons—an increase of 39,002 tons upon the preceding week, and of 47,026 tons upon the corresponding week of last year. For the year to date, the total shipments have been 924,953 tons—an increase of 21,257 tons upon the same period of last year.

Harrow and Stanmore Gas Company.—At the half-yearly general meeting of this Company on the 2nd prox., the Directors will report a sum of £4399 as the balance of the profit and loss account for the six months ending Dec. 31. They will recommend dividends at the rates of 8, 7, £5 12s., and 6 per cent. per annum, less income-tax.

Explosion at the Redditch Gas-Works.—An explosion occurred at the Redditch Gas-Works on Sunday of last week while a man named Mills was engaged in cleaning out a pipe in one of the retort-benches. He was assisted by another man; and they were using a lighted candle. The work was nearly finished, when there was a sudden escape of gas, followed by an explosion. Mills was badly burnt about the chest and face, and had to be detained at the hospital. The other man was momentarily blinded by smoke and dust, but was otherwise unhurt.

Gas Exhibition and Lectures at Sandwich.—Under the auspices of the Gas Committee of the Sandwich Corporation, an exhibition of gas appliances was held in the Town Hall from the 5th to the 7th inst. The exhibits, which were shown in the Council Chamber, were varied and representative, and furnished by most of the usual makers. The Magistrates' room was divided, and effectively fitted up as a drawing-room and a combined bedroom and nursery. Messrs. Fletcher, Russell, and Co., Limited, provided a gas-worked laundry; and a complete "penny-in-the-slot" installation was on view. In the scullery and bath room department, there were several types of water-heaters. The whole of the exhibits were arranged by Mr. T. Ebenezer Pye, the Manager of the Gas Department, who gave lectures on the production and use of gas, with demonstrations in cookery by Mrs. Pye. The exhibition was in every way a success, being visited by a large number of people.

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Reduction in Price.—The Hull Gas Committee have resolved that the price of gas in the Old Town shall be reduced by 2d. per 1000 cubic feet as from the March quarter readings; and that the quantity of gas by prepayment meter be increased from 24 to 26 cubic feet per penny in the case of those consumers having fittings supplied by the Corporation, and from 26 to 28 cubic feet to those consumers supplying their own fittings.

The Corporation of London and the Gaslight and Coke Company.—At the meeting of the Court of Common Council last Thursday, the Streets Committee reported further on the reference to them of the 5th ult. relative to the Bill of the Gaslight and Coke Company and that promoted by the London County Council to amend the Company's Acts. They recommended that the former should be opposed, and that a petition should be signed in favour of the latter, or against alterations therein, as may be found expedient; and this was unanimously agreed to without discussion.

Quality of the Gosport Water Supply.—As the outcome of correspondence between the Ratepayers' Association and the Gosport Water-Works Company, the following resolution, accompanying the one passed at the ratepayers' meeting on the 21st ult. (*ante*, p. 241) has been sent to the Chairman of the District Council: "That this Association calls upon the District Council to take immediate steps to make the resolution effective. Failing other means, this meeting of ratepayers pledges itself to make application to the Local Authority, with the object of getting put into force section 52 of the Public Health Act of 1875."

The Pressure of Rates and Taxes.—Addressing the shareholders at the meeting of the Great Northern Railway Company on Friday, Lord Allerton stated that in the decade ending 1902 the capital had increased to the extent of 28 per cent., the gross receipts by 29 per cent., and the expenditure by 42 per cent.; the net receipts had gone up by 11·5 per cent., while rates and taxes had increased 78 per cent. In the ten years they paid £90,000 more in rates, and their receipts had increased by only £186,000. He could not help thinking that figures like these justified some alarm in the minds of railway shareholders, and some action on the part of directors.

Wellington District Council and the Gas Company.—At a special meeting of the Wellington Urban District Council on Monday last week, the Chairman (Dr. Hollies) stated that certain negotiations, of a more or less formal character, had taken place with the Directors of the Gas Company in regard to their Bill. But they had not made very much progress; and it had therefore become necessary for the Council to present a petition against the Bill. They had had a very valuable report from Mr. T. Newbigging which had greatly strengthened them in the course they felt they were bound to pursue. He therefore moved that a petition be presented. Mr. Partridge seconded the motion. Mr. Lawrence expressed the hope that better counsels would prevail between the parties before a parliamentary fight commenced. Mr. Hayward asked if the Council had met the Company in the most conciliatory spirit possible. The Chairman replied that he was perfectly certain the Committee appointed to confer with the Directors of the Company had used their best endeavours to meet them in that spirit. Mr. Clift supported the remarks of the Chairman, saying it was not the desire of the Council to insist upon undue sacrifices on the part of the Company. The motion was carried unanimously.

The Proposed New Gas-Works for Birmingham.—Persistent opposition at Erdington to the gas-works proposed to be erected by the Birmingham Corporation has resulted in the *fiasco* generally anticipated. As already reported (*ante*, p. 306) the District Council, after a somewhat lively contest over the proposal to resist the Bill in Parliament, gave their sanction to this course, in spite of strong opposition. But this policy required the approval of the ratepayers; and the necessary appeal to the electorate took place on Monday last week at a meeting presided over by Mr. J. Dawson (Chairman of the Council). With a view to conciliate the opposition, he disclaimed any intention of fighting Birmingham at any cost; but, as he equally objected to be entirely at the mercy of the city, he proposed the presentation of a petition merely to give the Council *locus standi* in the House, and enable them to make terms. This proposal was seconded by Mr. Aston. The opposition, however, speedily made its strength felt, and several councillors urged that the works would raise the rateable value of the district, and furnish a new outlet for labour. On the vote being taken, the resolution in favour of opposition was defeated by a substantial majority; the result being received with much enthusiasm. The Chairman asked for a repetition of the vote; but he did not persist in his claim, and subsequently accepted the decision. As a poll was demanded, the result is still in some doubt.

Sowerby Bridge Gas and Water Supply.—The Accountant to the Sowerby Bridge District Council (Mr. J. Barraclough) has issued a statement in regard to the financial position of the Council. He shows that the gas-works were purchased from the Gas Company in 1861; the amount of purchase-money being £18,396. The expenditure on works and mains, &c., from 1861 to 1864 was £18,142. From 1864 to the end of last December, further amounts were expended as follows: Land in Holmes, £1625; holders, purifiers, sulphate plant, buildings, &c., £20,868; and meters, mains, stoves, lamps, &c., £21,120. The total expenditure on the works to the end of the year was £82,671. In addition, £12,786 was expended on the purchase of the Luddenden Foot works, mains, meters, &c.; making a total of £95,457. Loans have been raised from time to time to meet this expenditure amounting to £91,947, of which £67,808 has been repaid. The water supply was commenced in 1864, the water being obtained from the Halifax Corporation and delivered into the reservoir belonging to the then Local Board at Cote Hill. The total cost in connection with the supply has been £10,438, made up as follows: Parliamentary reservoirs, house, &c., £3494; meters and mains expenses, £6944. To meet this, £10,141 was borrowed, the whole of which has been repaid except £1080. This amount will be cleared off on March 20, 1906, and will result in a saving of £396 per annum after that date.

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*Name on application.

WRITE FOR PARTICULARS.

RICHMOND'S.

Sale of Welsh Water Stock.—At the Mart, last Wednesday, Messrs. Fox and Bousfield sold some of the Wrexham Water Company's consolidated stock at 160 per cent,, and some 4½ per cent. consolidated preference stock at 105 per cent.; also some of the Brymbo Water Company's consolidated stock at 90 per cent.

Street Lighting in Kensington.—The Gaslight and Coke Company have offered the Kensington Borough Council a loan of £4200, free of interest, repayable in twenty quarterly instalments of £210 each, for the purpose of converting 2000 14-candle power flat-flame burners into the incandescent system, with a light of 80-candle power per lamp, or increasing the total illuminating power of the lamps from 32,000 to 160,000 candles. The charge will be £2 os. 6d. per lamp per annum, with an additional annual charge of £1 8s. 6d. for the maintenance of lamps, mantles, and apparatus. The offer has been referred to the Works Committee.

Artesian Wells at Battersea.—At last Wednesday's meeting of the Battersea Borough Council, the Housing Committee reported having had under consideration a scheme prepared by the Baths Superintendent and Engineer for the supply of water, by means of artesian wells, to the Latchmere Estate dwellings. Provision was made in the scheme for a supply for 322 families, three hydrants, and a drinking fountain, with hose for watering gardens. The capital outlay for carrying out the scheme was estimated at £3271; and the annual charges, including a sum set aside for depreciation, £246, against a capital outlay of £2437 for a supply of water from the Southwark and Vauxhall Water Company, with annual charges of £425. The Public Analyst reported upon two samples of water taken from the artesian wells supplying the baths in the Latchmere Road. His report was to the effect that it was very suitable for domestic purposes. The scheme was adopted.

Proposed Bacteria Beds at Hertford and the East London Water Supply.—At the meeting of the Poplar Borough Council held last Friday, the following resolution was unanimously adopted: "That this Council views with alarm the proposals of the Hertford Corporation and the East London Water Company to construct bacteria beds to deal with the Hertford sewage (of 9000 inhabitants), such bacteria beds being an experiment. The Council would point out to the Local Government Board that the effluent from the bacteria beds would be passed down to the River Lea (without land treatment), and become part of the drinking water of the people of East London. The Council would further point out that, in the event of an accident happening to the bacteria beds, or persons connected with the sewage works neglecting their duty and the bacteria passing into the River Lea, this in all probability would cause a terrible calamity to the inhabitants of East London. The Council beg to urge upon the Local Government Board the seriousness of the proposals presented to them by the Hertford Corporation jointly with the East London Water Company, and the Council most respectfully requests the Local Government Board to reject the bacteria scheme, having regard to the life and health of the people of East London."

Waste of Water at Devonport.—The newly-appointed Water Engineer of the Devonport Corporation (Mr. F. W. Lillicrap) has informed the Town Council that there were 340,000 gallons of water running to waste daily between two points on the Devonport system of water supply, and that this waste, which might be stopped, would furnish a supply for 11,000 people.

The Directors of the Gas, Water and General Investment Trust, Limited, recommend dividends for the half year to the 28th ult. at the rates of 4½ per cent. per annum on the preferred stock, and 5 per cent. per annum on the deferred stock, making for the year 4½ per cent. on the former and 4 per cent. on the latter—and carrying forward about £13,000.

The Chelsea Water-Works Company, as will be seen by the advertisement elsewhere, are inviting tenders for an amount of 3 per cent. (redeemable) debenture stock to realize £22,515, being the sum expended by the Company for works of intercommunication under the powers of the Metropolis Water Act, 1899. The minimum price is fixed at £95 per cent.

As will be seen by an announcement which appears elsewhere, Mr. Atkinson Gibson will offer next Thursday, at the Queen's Hotel, Sunderland, sufficient new stock (maximum dividend 5 per cent.) of the Sunderland and South Shields Water Company to raise £24,400. It is being issued under the powers contained in the Company's Act of 1891, and it will bear dividend from the 1st ult.

In connection with the recent annual meeting of the Shanklin Gas Company, the usual dinner was given to the employees, under the presidency of Mr. R. Young, the Vice-Chairman. The toast of "The Chairman and Directors" was submitted by Mr. F. C. Taylor, the Engineer and Secretary, who was complimented on the excellence of the service he and the staff generally rendered to the Company.

The enlargement of the London County Council's Westminster gas-meter testing-office is now well in hand. Already £13,405 has been voted for the purchase of the freehold, and arrangements are being made for the supply of the new plant, which is estimated to cost £500, and for the repairs of the old plant, for which £300 is provided. At their meeting on Tuesday last, the Council approved of the recommendation of the Public Control Committee to invite tenders from the principal manufacturing firms for carrying out this work.

We have received from Messrs. Fletcher, Russell, and Co., Limited, their new catalogue (List No. 233) of gas heating, laboratory, and workshop appliances designed by them. The firm have for years made a specialty of apparatus for the utilization of gas for industrial purposes; and the catalogue bears evidence of the extent to which this department of the business has developed. The photographic illustrations and particulars of furnaces, blowpipes, blowers, plumbers' stoves, boilers, burners, &c., occupy 112 large quarto pages, and they are all exceedingly well printed.

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COLCHESTER	300,000
BIRKENHEAD	2,250,000
SWINDON (New Swindon Gas Co.)	120,000
SALTLEY, BIRMINGHAM (Second Contract)	2,000,000
WINDSOR ST., BIRMINGHAM (Second Contract)	2,000,000
HALIFAX	1,000,000
TORONTO	250,000
OTTAWA	250,000
LINDSAY (Remodelled)	125,000
MONTREAL	500,000
TORONTO (Second Contract Remodelled)	2,000,000
BELLEVILLE	250,000
OTTAWA (Second Contract)	250,000
BRANTFORD (Remodelled)	200,000
ST. CATHERINES (Remodelled)	250,000
KINGSTON, PA.	125,000
PETERBOROUGH, ONT.	250,000
WILKESBARRE, PA.	750,000
ST. CATHERINES (Second Contract)	250,000
BUFFALO, N.Y.	2,000,000
WINNIPEG, MAN.	500,000
COLCHESTER (Second Contract)	300,000
YORK	750,000
ROCHESTER	500,000
KINGSTON, ONT.	300,000
CRYSTAL PALACE DISTRICT	2,000,000
DULUTH, MINN.	300,000
CATERHAM	150,000
LEICESTER	2,000,000
ENSCHEDE (HOLLAND)	150,000
BUENOS AYRES (RIVER PLATE CO.)	700,000
BURNLEY	1,500,000
KINGSTON-ON-THAMES	1,750,000
ACCRINGTON	500,000
TONBRIDGE	300,000
STRETFORD	500,000
OLDBURY	300,000
TODMORDEN	500,000
SALTLEY, BIRMINGHAM (Third Contract)	2,000,000
YORK (Second Contract)	750,000
ROCHESTER (Second Contract)	500,000
NEWPORT (MON.)	250,000
TOKIO, JAPAN	1,000,000
PERNAMBUCO (Brazil)	125,000
MALTON	150 000
DULUTH, MINN. (Second Contract)	300,000
BROCKVILLE (ONT.)	250,000

Complete Gas-Works at NELSON, BRITISH COLUMBIA.

LEEDS, 1,800,000 Cub. Ft. SMETHWICK, 500,000 Cub. Ft. LEICESTER (2nd Cont.), 1,000,000 Cub. Ft.
GRAVESEND, 300,000 C. Ft. NEWPORT, MON. (2nd Cont.), 250,000 C. Ft. TORONTO (3rd Cont.), 750,000 C. Ft.

WANTED, FOR SALE, CONTRACT, &c., ADVERTISEMENTS IN THIS WEEK'S "JOURNAL."

SITUATIONS VACANT.
CONSULTING GAS ENGINEER. Clonmel. March 7.
GAS-STOVE REPRESENTATIVE. Arden Hill & Co., Aston.
MANAGER. Harwich Gas Company. Feb. 28.
MANAGER. Hebden Bridge. Feb. 28.
MECHANIC AND SMITH. No. 3983.
WORKING FOREMAN. Burton-on-Trent. Feb. 24.
WORKING FOREMAN. Swadlincote. Feb. 24.

SITUATION WANTED.—MANAGER OR ASSISTANT. No. 3994.

BUSINESS FOR DISPOSAL.—Greenall's Meter Syndicate, Leeds.

PLANT, &c. (Second-Hand), FOR SALE.
CONDENSER. Redditch Gas-Works.
EXHAUSTER AND ENGINE (combined). No. 3987
GAS-WORKS PLANT AND BUILDINGS. (By Auction.) Cromer. Feb. 24.
PURIFIERS. Lancaster Gas Department.

MEETINGS OF COMPANIES.
BRIGHTON AND HOVE GAS COMPANY. March 6.
BROMLEY GAS COMPANY. Feb. 26.
KENT WATER-WORKS COMPANY. Feb. 25.

SALES OF STOCKS AND SHARES.
CHELSEA WATER-WORKS COMPANY. March 4.
LEATHERHEAD GAS COMPANY. March 6.
LOWESTOFT WATER AND GAS COMPANY. Feb. 24.
PORTSMOUTH WATER COMPANY. April 2.
SOUTH WEST SUBURBAN WATER COMPANY. Feb. 24.
SUNDERLAND AND SOUTH SHIELDS WATER COMPANY. Feb. 19.
WEST HAM GAS COMPANY. Feb. 18.

TENDERS FOR

AMMONIACAL LIQUOR.
BRISTOL GAS COMPANY. Tenders by Feb. 24.
HAWORTH GAS DEPARTMENT. Tenders by Feb. 26.
MANCHESTER GAS DEPARTMENT. Tenders by March 26.

BURNERS, MANTLES, FITTINGS, &c.
NEWTON-IN-MAKERFIELD. Tenders by Feb. 27.

ENGINE AND EXHAUSTERS, &c.
DUNDEE GAS DEPARTMENT. Tenders by Feb. 25.

FIRE CLAY GOODS.
LEIGH GAS DEPARTMENT. Tenders by Feb. 19.
NEWTON-IN-MAKERFIELD. Tenders by Feb. 27.

GASHOLDER TANK.—BATH GAS COMPANY. Tenders by March 4.

GASHOLDERS.
COPENHAGEN. Tenders by April 7.
WINSFORD GAS DEPARTMENT. Tenders by March 3.

GAS-WORKS.—SILSDEN DISTRICT COUNCIL. Tenders by Feb. 23.

GENERAL STORES, VALVES, PAINTS, &c.
BRIGHOUSE GAS DEPARTMENT. Tenders by March 3.
NEWTON-IN-MAKERFIELD GAS DEPARTMENT. Tenders by Feb. 27.

GOVERNORS.
EVESHAM GAS DEPARTMENT. Tenders by Feb. 27.
WINSFORD GAS DEPARTMENT. Tenders by March 3.

INCANDESCENT LIGHTING.—UXBRIDGE. Tenders by Feb. 24.

LAMP COLUMNS.—NEWTON-IN-MAKERFIELD. Tenders by Feb. 27.

LIME.—SALFORD GAS DEPARTMENT. Tenders by Feb. 19.

METERS.—NEWTON-IN-MAKERFIELD. Tenders by Feb. 27.

OXIDE OF IRON (New and Spent).
ROCHDALE GAS DEPARTMENT. Tenders by Feb. 24.
ULVERSTON GAS DEPARTMENT. Tenders by Feb. 26.

PIPES AND CONNECTIONS, &c.
BRIGHOUSE GAS DEPARTMENT. Tenders by March 3.
BROADSTAIRS GAS COMPANY. Tenders by Feb. 21.
EDINBURGH AND LEITH GAS COMMISSIONERS. Tenders by Feb. 23.

PURIFIERS.—LANCASTER GAS-WORKS.

RETORT FITTINGS.—LEICESTER GAS-WORKS. Tenders by Feb. 21.

RETORTS.
LEIGH GAS DEPARTMENT. Tenders by Feb. 19.
NEWTON-IN-MAKERFIELD. Tenders by Feb. 27.

SULPHURIC ACID.
ULVERSTON. Tenders by Feb. 26.
NEWTON-IN-MAKERFIELD. Tenders by Feb. 27.

TAR.
DARWEN GAS DEPARTMENT. Tenders by Feb. 21.
EXETER GAS COMPANY. Tenders by March 14.
HAWORTH GAS DEPARTMENT. Tenders by Feb. 26.
MANCHESTER GAS DEPARTMENT. Tenders by March 26.

NOTICES TO CORRESPONDENTS, ADVERTISERS, AND SUBSCRIBERS.

No notice can be taken of anonymous communications. Whatever is intended for insertion in the "JOURNAL" must be authenticated by the name and address of the writer; not necessarily for publication, but as a proof of good faith.

COPY FOR ADVERTISEMENTS for the "JOURNAL" should be received at the Office NOT LATER than TWELVE O'CLOCK NOON ON MONDAY, to ensure insertion in the following day's issue.

Orders for Alterations in, or Stoppages of, PERMANENT ADVERTISEMENTS should be received by the FIRST POST on SATURDAY.

Wanted, For Sale, and Tender Advertisements, Six Lines and under 3s.; each additional Line, 6d.

TERMS OF SUBSCRIPTION to the "JOURNAL."

One Year, 21s.; Half Year, 10s. 6d.; Quarter, 6s. 6d.

Payable in Advance. If credit is taken, the charge is 25s. a year.

All Communications, Remittances, &c., to be addressed to
WALTER KING, 11, BOLT COURT, FLEET STREET, LONDON, E.C.
Telegrams: "GASKING, LONDON." Telephone: P.O. 1571a Central.

GAS PURIFICATION AND CHEMICAL COMPANY, LIMITED.

OXIDE OF IRON.

O'NEILL'S Oxide has a larger annual sale than all other Oxides combined. Purity and uniformity of quality guaranteed.

JOHN WM. O'NEILL, Managing Director,
160, 161, & 162, PALMERSTON HOUSE,
OLD BROAD STREET,
LONDON, E.C.

ANDREW STEPHENSON, AGENT. All communications RE OXIDE to the COMPANY as above.

WINKELMANN'S
"VOLCANIC" FIRE CEMENT.
Resists 4500° Fahr. Best for GAS-WORKS.
ANDREW STEPHENSON, 182, Palmerston House, Old Broad Street, London, E.C. "Volcanism, London."

HYDRATED OXIDE OF IRON.
PREPARED from Pure Iron.
Twice as Rich as Bog Ore.
Gives no Back Pressure.
The Cheapest in the Market.
Can be Lent on Hire.
Can be Exchanged for Spent Oxide.
READ HOLLIDAY AND SONS, LTD., HUDDERSFIELD.

J. & J. BRADDOCK (Branch of Meters Limited), Globe Meter Works, OLDHAM, and 45 & 47, Westminster Bridge Road, LONDON, S.E.
First-Class Award, Melbourne Exhibition, 1889, for WET AND DRY GAS-METERS, STATION METERS, AND GOVERNORS, PRESSURE-GAUGES, STREET LAMPS AND PILLARS, &c.
Telegraphic Addresses:
"Braddock, Oldham." "Metrique, London."

DUTCH OXIDE OF IRON.

EERSTE Hollandsche Yzererts Maaty (First Dutch Bog Ore Company, Ltd.), ROTTERDAM.
General Manager for England and Wales—
CHARLES E. FRY, LEAMINGTON; and at Tower Chambers, Brown Street, MANCHESTER.
London Managers—
E. PADFIELD & CO., 96-98, Leadenhall Street, LONDON, E.C.
General Manager (for Scotland)—
J. B. MACDERMOTT, 11, Bothwell St., GLASGOW.

BROTHERTON & CO., LIMITED.
Offices: Commercial Buildings, LEEDS.
Correspondence invited.

COAL GAS TAR wanted.
Gas Managers in Gloucester, Somerset, Worcester, Devon, Wilts, Hereford, Monmouth, and Glamorgan PLEASE NOTE. BEST PRICE offered either on Fixed or Sliding-Scale Basis.
State Quantity to offer for Prompt and Forward Delivery.
The SHARPNESS CHEMICAL COMPANY, Tar Distillers, Sharpness Docks, GLOS.

OXIDE OF IRON.
FIRE CEMENT, PAINT, GAS COAL.
BALE & CHURCH, 5, CROOKED LANE, LONDON, E.C.

PATENTS AND TRADE MARKS
PUBLICATIONS. "MERCHANDISE MARKS ACT, and Decisions thereunder," 1s.; "TRADE SECRETS v. PATENTS," 6d.; "DOCTRINE of EQUIVALENTS, Mechanical and Chemical," 6d.; "SUBJECT-MATTER of PATENTS," 6d.
MEWBURN, ELLIS, & PRYOR, Chartered Patent Agents, 70 and 72, Chancery Lane, London, W.C. Telegrams: "Patent London." Telephone: No. 243 Holborn.

GAS TAR wanted.
BROTHERTON AND CO., LTD., Tar Distillers. Works: BIRMINGHAM, LEEDS, and WAKEFIELD.

AMMONIACAL LIQUOR wanted.
BROTHERTON AND Co., LTD., Ammonia Distillers. Works: BIRMINGHAM, LEEDS, and WAKEFIELD.

NEW GAS PLANT CEMENT.
JOHN E. WILLIAMS AND CO.,
VICTORIA PAINT WORKS,
MANCHESTER.
For all Joints in connection with Oil-Gas Plant and Sulphate Plant.
For all Gas Joints.
For all Tar Joints.
For all Ammonia Joints.

SULPHURIC ACID for Sale.
BROTHERTON AND Co., LTD., Chemical Manufacturers. Works: BIRMINGHAM, LEEDS, and WAKEFIELD.

SULPHATE OF AMMONIA
SATURATORS and LEAD WORK for Sulphate of Ammonia Plants.
For REPAIRS or ALTERATIONS, ring up "0848 BOLTON," or Telegraph "SATURATORS, BOLTON."
Largest Practice and most Up-to-Date Works in Britain.
JOSEPH TAYLOR AND Co., CENTRAL PLUMBING WORKS, BOLTON.

IT is worth your while to buy direct.
THE RELIANCE LUBRICATING OIL COMPANY 19 and 20, Water Lane, Great Tower Street, London, E.C., handle all kinds of Lubricating Oils, for Engines, Cylinders, Dynamos, Spindles, &c., Burning Oils, Solar Distillates, Carburetting Oils, and Spirits for Gas Making; Motor Oils, Fuel Oils, Animal, Fish, and Vegetable Oils, &c., for all purposes. Write for our "Trade Mark" Inkstand, sent free to customers. Non-customers, 2s. 6d. each. RELIANCE LUBRICATING OIL COMPANY, London, Glasgow, Newcastle-on-Tyne, &c. Established 1858. Telegraphic Address: "Subastral," London; A.B.C. Code used. Telephone No.: Avenue 5891.

PENNY-IN-THE-SLOT WORK.
H. GREENE & SONS, Ltd., are prepared to give QUOTATIONS to Gas Companies or Corporations for FITTING UP COMPLETE and CARRYING OUT the WORK in its entirety, either in Iron or Compo.
SURREY ENGINEERING WORKS, BLACKFRIARS ROAD, LONDON, S.E.
Telephone: 1698 HOP. Telegrams: "LUMINOSITY."

WANTED, AN APPOINTMENT,
AS MANAGER of a medium-sized Works, or ASSISTANT-MANAGER in a large Gas-Works, by a fully qualified Gas Engineer and Manager, who has had large experience in the Management of Works, and in the Designing, Setting Out, and Construction of up-to-date Gas Plant. Moderate Salary. Excellent References and Testimonials.
Address No. 3994, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

GAS-STOVE Representative Wanted.
Must be experienced.
Apply to ARDEN HILL AND Co., Aston, BIRMINGHAM.

MECHANIC and Smith wanted, at once. Permanent Situation to good man (Birmingham District).
Apply, by letter, stating all Particulars, to No. 3983, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

CONSULTING GAS ENGINEER.
WANTED, a Qualified Gentleman to inquire into and examine the Clonmel Gas-Works, and to report thereon to the Gas Committee of the Clonmel Corporation. The engagement might lead to a permanent appointment.
Applications, stating Terms and Qualifications, to be sent to Thomas Phelan, Esq., Chairman of the Committee, Spring Garden, Clonmel, by the 7th of March, 1903.
Further Information will be supplied upon application to the Secretary.

HEBDEN BRIDGE AND MYTHOLMROYD GAS BOARD.
WANTED, a Manager for Gas-Works.
Must have a knowledge of Carburetted Water-Gas Plant, and be a thoroughly practical man.
Make of Gas per annum, about 85 Million cubic feet.
Applicants to state Age, Experience, and Salary required.
Applications to be sent to the undersigned on or before Feb. 28, 1903.
RICHARD CRABTREE,
Clerk to the said Board.
Council Offices, Hebden Bridge,
Feb. 13, 1903.

WANTED, at once, a General Working FOREMAN, who must have full knowledge of the whole routine of Gas-Works, and the working of Generator Settings, and be able to undertake all Repairs and Lay Mains, Services, &c. He must be a thoroughly practical Man, Sober, Steady, and capable of taking entire charge of the Works in the absence of the Manager. Age 25 to 40. Wages to commence at 30s. per week, with House, Gas, and Coal free.
Apply, by letter, with not more than two recent Testimonials, stating present Position and Age, on or before Twelve noon, Feb. 24 next, endorsed "General Foreman," to Mr. G. B. SMEDLEY, Engineer and Manager, Gas-Works, Swadlincote, near BURTON-ON-TRENT.

HARWICH GAS AND COKE COMPANY.
WANTED, by the Harwich Gas and Coke Company, a steady, practical Man as MANAGER, whose Age must not exceed Forty Years. He must be a good Carbonizer, used to Engine and Exhausters, able to take Indices of Meters, lay Mains and Services, have a knowledge of Fitting, and the General Routine of a Gas-Works.
Wages commencing at £2 10s. per week, with House, Gas, and Coal.
Annual make of Gas about 26 Millions, and increasing.
Applications, by letter, stating Age, with not more than Three Testimonials as to Ability and Character, to be sent to the undersigned not later than the 28th day of February.
GEORGE BAINES,
Secretary to the Harwich Gas and Coke Company.
Harwich.

TO BE SOLD—Purifiers, Two or Four, 10 feet square by 4 ft. 6 in. deep, planed Joints, Connections, and Overhead Girders.
Write J. WRIGHT, 181, QUEEN VICTORIA STREET, E.C.

A BARGAIN—Water-Cooled Condenser in perfect condition. Capacity 250,000 cubic feet per 24 Hours.
Address A. E. LAYTON, Gas-Works, REDDITCH.

EXHAUSTER, with Engine combined, 8000 to 15,000 cubic feet per hour, all Connections, by Tangye. In capital order. £90.
Address No. 3987, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

FOR SALE—Very good Gas Plant as under:—
PURIFIERS—Four, 12 feet square, with 8-inch Centre-Valve and Connections. Planed Joints.
Kirkham WASHER-SCRUBBER, 300,000 cubic feet per diem., with Engine and 8-inch Valves and Connections.
Livesey WASHER, 250,000 cubic feet per diem, with 8-inch Valves and Connections.
Photos. sent on application to SAML. WHILE AND SON, 60, Queen Victoria Street, LONDON, E.C.

MANCHESTER CORPORATION GAS-WORKS.
TO TAR DISTILLERS AND OTHERS.
THE Gas Committee of the Corporation of Manchester are prepared to receive TENDERS for the Purchase and Removal, on the Sliding-Scale Basis, of the GAS TAR to be produced at their Bradford Road Station during a period of One, Two, or Three Years, commencing at noon on the 31st of March, 1903.
The Committee reserve the right to divide the Tenders as they may consider advisable.
Sealed Tenders, addressed to the Chairman of the Gas Committee, and endorsed "Tender for Gas Tar," must be delivered at the Offices of the Gas Department, Town Hall, on or before Thursday, the 26th day of March, 1903.
Full Particulars and Tender Form may be obtained on application, in writing, to Mr. Charles Nickson, Superintendent of the Gas Department.
By order of the Gas Committee,
WM. HENRY TALBOT,
Town Clerk.
Town Hall, Manchester.
Feb. 13, 1903.

MANCHESTER COPORATION GAS-WORKS.
TO TAR DISTILLERS AND OTHERS.
THE Gas Committee of the Corporation of Manchester are prepared to receive TENDERS for the Purchase and Removal of the TAR to be produced by the Carburetted Water-Gas Plant at their Bradford Road Station during One, Two, or Three Years, commencing at noon on the 31st of March, 1903.
The Committee do not bind themselves to accept the highest or any Tender.
Sealed Tenders, addressed to the Chairman of the Gas Committee, and endorsed "Tender for Carburetted Water-Gas Tar," must be delivered at the Offices of the Gas Department on or before Thursday, the 26th day of March, 1903.
Full Particulars and Tender Form may be obtained on application, in writing, to Mr. Charles Nickson, Superintendent of the Gas Department.
By order of the Gas Committee,
WM. HENRY TALBOT,
Town Clerk.
Town Hall, Manchester,
Feb. 13, 1903.

MANCHESTER CORPORATION GAS-WORKS.
AMMONIACAL LIQUOR.
THE Gas Committee are prepared to receive OFFERS for the conveyance of AMMONIACAL LIQUOR by boat, from Gaythorn Station and Droylsden Station to the Bradford Road Station, during a period of One, Two, or Three Years, commencing at noon on the 31st of March, 1903.
Sealed Tenders, addressed to the Chairman of the Gas Committee, and endorsed "Tender for Conveyance of Ammoniacal Liquor," must be delivered at the Offices of the Gas Department, Town Hall, on or before Thursday, the 26th day of March, 1903.
Full Particulars and Tender Form may be obtained on application (in writing only) to Mr. Charles Nickson, Superintendent, Gas Department, Town Hall, Manchester.
By order of the Gas Committee,
WM. HENRY TALBOT,
Town Clerk.
Town Hall, Manchester,
Feb. 13, 1903.

GAS-METERS wanted, old disused Wet. Copper Lamp Frames, Brass, Pewter, Tin, Zinc, Lead Ashes, Old Copper Electric Cable, &c., for Cash.
J. SMITH, Canal Road, BRADFORD.

GAS PLANT for Sale—I can always offer NEW and SECOND-HAND GAS APPARATUS, including Retorts and Fittings, Condensers, Exhausters, Scrubbers, Washers, Purifiers, Gasholders, Tanks, Valves, Connections, &c. Also a few COMPLETE WORKS. Compare Prices and Particulars before ordering elsewhere.
J. F. BLAKELEY, Gas Engineer, Thornhill, DEWSBURY.

CORPORATION OF LEICESTER.
RETORT FITTINGS, HYDRAULIC MAINS, MOUTHPIECES, &c.
SECTION No. 1.—CONTRACT No. 73.
THE Gas and Electric Lighting Com- mittee of the above Corporation are prepared to receive TENDERS for the supply of RETORT FITTINGS, HYDRAULIC MAINS, SELF-SEALING MOUTHPIECES, &c., at their Aylestone Road Works.
Drawings may be seen, and Specification and Form of Tender obtained, upon application to the Engineer, and on payment of the sum of £5, which amount will be returned upon receipt of a *bond-fide* Tender.
Tenders, addressed to Mr. Councillor Edwards, Chairman, and endorsed "Tender for Retort-Fittings, &c.," to be delivered at these Offices not later than Eleven o'clock a.m., on Saturday, the 21st day of February, 1903.
The Committee do not bind themselves to accept the lowest or any Tender.
ALFRED COLSON, M.Inst.C.E., M.Inst.E.E.,
Engineer and Manager.
Offices: Millstone Lane,
Leicester, Feb. 1903.

BOROUGH OF EVESHAM.
(GAS DEPARTMENT.)
THE Corporation of the Borough of Evesham invite TENDERS for the supply of a new GOVERNOR for 12-inch Gas-Mains.
Further Particulars and Specifications may be obtained of the Corporation's Engineer and Manager, Mr. P. H. Fletcher, Gas-Works, Evesham.
Tenders, with Specifications, to be sent in to me on or before Friday, the 27th of Feb. inst.
The Corporation do not bind themselves to accept the lowest or any Tender.
THOS. A. COX,
Town Clerk.
Evesham, Feb. 13, 1903.

ULVERSTON URBAN DISTRICT COUNCIL.
OXIDE OF IRON.
THE Gas and Water Committee invite TENDERS, accompanied by Analysis, for the supply of 50 Tons of HYDRATED OXIDE of IRON (Natural Bog Oxide), delivered at the Ulverston Railway Station; also for the purchase of 75 to 100 Tons of SPENT OXIDE.
Samples of the Spent Oxide may be had on application to the undersigned, from whom Forms of Tender and any further Information may be obtained.
Sealed Tenders, endorsed "Tender for Spent Oxide" or "New Oxide," must be delivered not later than the 26th inst., addressed to the Chairman of the Gas and Water Committee.
JNO. SWAN,
Engineer and Manager.

ULVERSTON URBAN DISTRICT COUNCIL.
B.O.V.
THE Gas and Water Committee invite TENDERS for the supply of B.O.V. made from Brimstone or Spent Oxide of a strength not less than 144° by Twaddle's Hydrometer, delivered at the Gas-Works Siding, North Lonsdale, during the Year ending the 31st of March, 1904.
The price to include carriage of return empty carboys.
Any further Information may be obtained on application to the undersigned.
Sealed Tenders, endorsed "Tender for B.O.V.," must be delivered not later than the 26th inst., addressed to the Chairman, Gas and Water Committee.
JNO. SWAN,
Engineer and Manager.

UXBRIDGE URBAN DISTRICT COUNCIL.
INCANDESCENT GAS LIGHTING.
THE Council are prepared to receive TENDERS for:—
1.—40 or more WELSBACH INCANDESCENT "C." BYE PASS BURNERS, with Lever and Chains, Glass Bulb, Mantle and Fork, and Greene's False Top Metal Reflector, and including the Reglazing of Bottoms of Lanterns, to be supplied and fixed complete in all respects in existing gas lanterns in district where directed, including the removal of the present flat-flame burners, at per lamp. Any other work required in reglazing or repairing lanterns not to be included.
2.—50 or more NEW LANTERNS required within ensuing Twelve Months, quoting separately for Metal and Copper Lanterns, of a make considered suitable, and of a quality similar to the "Commercial" Lantern, now fitted in the district, with Plate, Trap, and Clip, with the necessary Frog Iron with Ladder Bar, and fitted with Welsbach Incandescent No. 3 Kern Burners with Anti-Vibrator Governor, Glass Protector, Mantle, and Fork, and with Simmance and Abady's Lighting Cock and Tube, to be supplied and fixed complete in all respects to Lamp-Columns in the district where directed, including removal of present Lanterns, Cradles, &c., to remain the Contractor's property, at per Lamp.
The lowest or any Tender not necessarily accepted.
Tenders to be sent to the undersigned, addressed "Lamp Tender," not later than Twelve o'clock noon on Tuesday, the 24th of February, 1903.
W. T. HARVEY,
Clerk.
61, High Street, Uxbridge.

TO CAPITALISTS.

THE Greenall Positive Meter Syndicate having now fully developed their PATENT "POSITIVE METER"—which has been received with a large amount of success on its introduction, orders and repeat orders having been supplied to no less than 165 Gas Companies and Corporations within a period of Sixteen Months—they now consider the time has arrived for commencing manufacturing their Meters on a much larger scale, and would therefore be disposed to NEGOTIATE FOR THE SALE of their BUSINESS and PATENTS, either by Private Treaty or by Tender.

The highest or any offer not necessarily accepted.

All Offers to be addressed to the CHAIRMAN OF THE COMPANY at the Registered Offices, No. 7, Greek Street, LEEDS.

TENDERS FOR TAR.

THE Directors of the Exeter Gaslight and Coke Company invite TENDERS for their surplus TAR for Twelve Months from the 25th of March next, at per ton of 20 gallons, delivered into Contractor's Tanks at the Company's Works.

Sealed Tenders, endorsed "Tender for Tar," will be received by the undersigned on or before Saturday, the 14th of March next; but the Directors do not bind themselves to accept the highest or any Tender.

By order,
W. A. PADFIELD,
Engineer and Secretary.

WINSFORD URBAN DISTRICT COUNCIL.
(GAS DEPARTMENT.)

THE above Council are prepared to receive TENDERS for the supply, delivery, and fixing of a TELESCOPIC GASHOLDER, having inner lift 50 feet diameter by 20 feet deep, and outer lift 52 feet diameter by 20 feet deep, on Gadd and Mason's system, without guide-framing, working in a steel tank 53 ft. 6 in. diameter by 20 ft. 6 in. deep. Also one GOVERNOR for same.

Specifications and Form of Tender may be obtained upon application to Mr. F. Sidwell, Manager, Gas-Works, Winsford.

Tenders, endorsed "Gas Improvements," to be delivered to the undersigned on or before the 3rd day of March, 1903.

The Council do not bind themselves to accept the lowest or any Tender.

Dated this 10th day of February, 1903.

JNO. H. COOKE,
Clerk to the Council.

Council Offices, Russell Street,
Winsford, Cheshire.

BOROUGH OF ROCHDALE.

TO MANUFACTURING CHEMISTS AND OTHERS.

THE Gas Committee of the above Corporation invite TENDERS for the purchase of about 400 tons of SPENT OXIDE, containing upwards of 50 per cent. of Sulphur; also for supplying 200 Tons of NEW OXIDE, the guaranteed composition of which should be stated in the Tender.

Samples of the new material must be sent in to Mr. T. Banbury Ball, the Manager at the Gas-Works, Dane Street, on or before Tuesday, Feb. 24, 1903, from whom samples of the spent material may be obtained.

Tenders, endorsed "Oxide of Iron," stating price per ton delivered at the Gas-Works for the new Oxide, and per unit of Sulphur for the Spent Oxide, taken at the Gas-Works, must be sent in to me not later than noon on Wednesday, Feb. 25, 1903.

By order,
JAMES LEACH,
Town Clerk.

Town Hall, Rochdale.
Feb. 12, 1903.

SILSDEN URBAN DISTRICT COUNCIL.

NEW GAS-WORKS.

THE above Council are prepared to receive TENDERS for the construction of a COMPLETE GAS-WORKS, to be erected at Silsden by the 30th of March, 1904. The Works have been designed for an Annual make of 12 Million cubic feet.

The Drawings and Specifications may be seen at the Town Hall, Silsden, and copies of the Specifications only may be obtained upon application to the undersigned, upon payment of One Guinea each, which will not be returned.

Tenders to be addressed to the Chairman of the Council on or before the 23rd day of February, 1903, endorsed "Gas-Works."

The Council do not bind themselves to accept the lowest or any Tender.

By order,
JOHN DRIVER,
Clerk.

Town Hall, Silsden,
near Keighley.

THE BRISTOL GAS COMPANY.

AMMONIACAL LIQUOR.

THE Directors invite Tenders for the purchase of the LIQUOR to be produced at their three Stations during a period of One, Three, Five, or Seven Years commencing on the 1st day of July, 1903.

The annual quantities and strengths of the Liquor produced at each of the Stations are approximately as under:—

Avon Street ..	1,600,000 galls.,	13½-ounce strength.
Canons' Marsh	1,500,000 ,,	13 ,, ,,
Stapleton ..	1,900,000 ,,	15 ,, ,,

Particulars, with Forms of Tender, may be obtained on application to the undersigned, to whom also Tenders, sealed and endorsed "Tender for Ammoniacal Liquor," must be delivered not later than Tuesday, the 24th day of February, 1903.

The Directors do not bind themselves to accept the highest or any Tender.

JOHN PHILLIPS,
Secretary.

Chief Offices: Canons' Marsh,
Bristol, Jan. 31, 1903.

BROADSTAIRS GAS COMPANY.

THE Directors of the Broadstairs Gas Company are prepared to receive TENDERS for the supply and delivery of about 150 Tons of 6-inch CAST-IRON SOCKET and SPIGOT PIPES; and 70 Tons of 8-inch CAST-IRON SOCKET and SPIGOT PIPES.

Particulars, &c., may be obtained on application to the undersigned.

Tenders to be lodged with the undersigned not later than Feb. 21, 1903, endorsed "Tender for Main Pipes."

The Directors do not bind themselves to accept the lowest or any Tender.

By order,
F. HIGGINSON, Assoc.M.I.M.E.,
Engineer and Secretary.

GASHOLDER.

THE Lighting Department of the Corporation of Copenhagen invite TENDERS for the supply and erection of a THREE-LIFT GASHOLDER of 3 Million cubic feet capacity.

Full Particulars and Drawings may be obtained on application to the Engineering Office of the Eastern Gas-Works (Ostre Gasvaerks Tegnestue), Copenhagen.

Tenders, accompanied by the said Drawings, &c., to be delivered to the Director of the Lighting Department, 22, Vestre Boulevard, Copenhagen, not later than April 7, 1903, noon.

The Department will not be bound to accept the lowest or any Tender.

THE LIGHTING DEPARTMENT OF COPENHAGEN.
Feb. 10, 1903.

BOROUGH OF BRIGHOUSE.

THE Town Council are prepared to receive TENDERS for the supply of the following Stores—viz.: IRONMONGERY, OIL, PAINTS, &c., WROUGHT-IRON TUBES and FITTINGS, and BRUSHES required by the Gas Committee during the Year ending March 31, 1904.

Specifications and Form of Tender can be obtained on application at the Gas Engineer's Office, Mill Lane Works, Brighouse.

Sealed Tenders are to be sent in on or before Tuesday, the 3rd day of March, 1903, addressed to the Town Clerk, Municipal Offices, Brighouse.

The lowest or any Tender not necessarily accepted.

By order,
JAMES PARKINSON,
Town Clerk.

Municipal Offices, Brighouse.
February, 1903.

EDINBURGH AND LEITH CORPORATIONS' GAS COMMISSIONERS.

15-INCH CAST-IRON MAINS.

THE Gas Commissioners are prepared to receive TENDERS for the supply and delivery of about 370 Tons of 15-inch diameter CAST-IRON SPIGOT and FAUCET MAIN PIPES in 12 feet lengths, along with CONNECTIONS and SPECIALS.

Contractors may also quote for Pipes to their own pattern, but not exceeding the specified weight.

Deliveries to be in regular weekly quantities as required commencing at the end of March and continuing up to the 30th day of June next.

The Pipes to be delivered on the North British or Caledonian Railway Systems, or free on Rail at Leith or Granton Harbours.

Specifications, Schedules, and Forms of Tender may be obtained upon application to Mr. W. R. Herring, Chief Engineer and Manager, New Street Works, Edinburgh.

Tenders to be lodged with the undersigned on or before Monday, the 23rd day of February, 1903, not later than Ten a.m., endorsed "Tender for Main Pipes."

The Commissioners do not bind themselves to accept the lowest or any Offer, and reserve to themselves the right of accepting the whole or any portion of the Material tendered for.

JAMES M'G. JACK,
Clerk.

25, Waterloo Place, Edinburgh,
Feb. 3, 1903.

URBAN DISTRICT OF NEWTON-IN-MAKERFIELD.

TENDERS FOR SUPPLIES.

NOTICE is Hereby Given, that the Urban District Council of the above-named district are prepared to receive TENDERS from persons willing to contract for the supply of the following MATERIALS for One Year, commencing the 1st of April, 1903—viz.:

1, 2, and 3.—Wrought-Iron Steam Tubes and Fittings.
4.—Iron, Tin, Lead, Lead Piping, Bolts, Screws, Tools, and Main Cocks.
5.—General Ironmongery.
6.—Oilman's Goods and Painting Materials.
7.—Gas Burners, Mantles, Lanterns, Lamp Columns, and other Fittings for Lamps. Cement.
8.—Water-Meters, Cast-Iron Main Pipes, Sluice Valves, and Stop-Tap Boxes.
9.—Gas-Meters, Ordinary and Prepayment, Pendants and Brackets.
10.—Lime, Bricks, Fire-Clay, and Retorts.
11.—Brown Vitriol (140°).
12.—Disinfectants.
13.—Provender for Horses.

To be delivered free of expense within the District.

Printed Forms of Tender may be obtained from the "Stores Clerk," Gas-Works, Earlestown, between the hours of 9 and 5; Saturdays, 9 and 12.

No Tender will be considered unless made strictly in accordance with, and on one of, the printed Forms issued; and the same must be sealed and delivered to me at the Town Hall, Earlestown, before Twelve o'clock noon on Friday, the 27th of February, 1903, after which no Tender will be received.

The Council do not bind themselves to accept the lowest or any Tender.

By Order,
C. COLE,
Clerk to the Council.

Town Hall, Earlestown, Lancs.,
Feb. 10, 1903.

THE Haworth Urban District Council are prepared to receive TENDERS for the purchase of surplus TAR and AMMONIACAL LIQUOR, delivered on rails at Haworth Station, for the Year ending March 31, 1904.

Tenders to be sent to the undersigned not later than the 26th inst.

WILLIAM ROBERTSHAW,
Clerk to the Council.

North Street, Keighley.

THE Bath Gaslight and Coke Company invite TENDERS for the construction of a GAS-HOLDER TANK, 152 ft. 6 in. diameter, at their Works, Lower Bristol Road, Bath.

Specification and Drawings may be seen on application to the undersigned, on or after Monday, Feb. 16 inst.

Tenders, addressed to the Chairman, and endorsed "Tender for Gasholder Tank," to be delivered on or before Wednesday, March 4.

C. S. ELLERY,
Engineer and Manager.

DUNDEE GAS COMMISSIONERS.

THE Dundee Gas Commissioners are prepared to receive TENDERS for the supply and erection of an ENGINE, EXHAUSTERS, &c.

Plans may be seen, and Specification obtained, on application to the Engineer at the Gas-Works.

Tenders, marked "Tender for Exhausters, &c.," to be delivered to the Subscriber not later than the 25th of February, 1903.

The Commissioners do not bind themselves to accept the lowest or any Tender.

THOS. THORNTON,
Clerk to the Commissioners.

Dundee, Feb. 12, 1903.

TENDERS FOR PURIFIERS.

THE Lancaster Corporation Gas Committee hereby invite TENDERS for the supply of PURIFIERS (Green's type); also for the PURCHASE and REMOVAL of Four OLD PURIFIERS and the ALTERATION and FIXING of a WROUGHT-IRON GIRDER.

Plans and Specifications may be seen at the Gas-Works, St. George's Quay.

Sealed Tenders, endorsed "Purifiers," to be delivered to the Town Clerk on or before Twelve Noon, Monday, the 16th inst.

C. ARMITAGE,
Engineer.

BOROUGH OF LEIGH.
(GAS AND WATER DEPARTMENT.)

THE Gas Committee of the above Corporation invite TENDERS for the supply of FIRE-CLAY, RETORTS, and BRICKS.

Forms of Tender and further Particulars may be obtained on application to the Manager, Mr. J. Gibson, Gas-Works, Leigh.

Sealed Tenders, endorsed "Tender for Retorts, &c.," to be sent to the undersigned on or before Twelve o'clock noon, on Thursday, Feb. 19, 1903.

By order,
PEREGRINE THOMAS,
Town Clerk.

Town Hall, Leigh, Lancs.,
Feb. 4, 1903.

BOROUGH OF DARWEN.

THE Corporation are prepared to receive TENDERS for all the surplus TAR produced at their Gas-Works for a period of Twelve Months from the 1st of April next.

Further Particulars, and Forms of Tender may be obtained on application to Mr. A. H. Smith, Gas Engineer, Darwen.

Sealed Tenders, endorsed "Tender for Tar," and addressed to the undersigned, must be delivered at or before Noon, on Saturday, the 21st of February, 1903.

No Tender necessarily accepted.

By order,
WILLIAM P. HALLIWELL,
Town Clerk.

Town Clerk's Office,
Darwen, Feb. 3, 1903.

COUNTY BOROUGH OF SALFORD.
(GAS DEPARTMENT.)

THE Gas Committee invite Tenders for the supply of about 1000 Tons of LIME required for the purification of Gas at their respective Stations during the Twelve Months from date of acceptance of Tender.

Full Particulars may be obtained from Mr. Wm. W. Woodward, Engineer, Bloom Street, Salford.

Sealed Tenders, endorsed "Tender for Lime," addressed to the Chairman of the Gas Committee, Town Hall, Salford, to be delivered to me not later than Three p.m. on Thursday, the 19th of February, 1903.

L. C. EVANS,
Town Clerk.

Town Hall, Salford.
Feb. 11, 1903.

LEATHERHEAD GAS AND LIGHTING COMPANY.

NOTICE is Hereby Given, of Sale by TENDER of 200 SHARES of £10 each, being a portion of the Additional Share Capital authorized to be raised in pursuance of the powers of the Leatherhead Gas Act, 1901.

No Tender will be received after Eleven a.m. on Friday, the 6th day of March, 1903.

Forms of Tender can be obtained on application to the Secretary.

By order,
JOHN YOUNG,
Secretary.

Leatherhead,
Feb. 6, 1903.

BRIGHTON AND HOVE GENERAL GAS COMPANY.

TO THE PROPRIETORS.

NOTICE is Hereby Given, that the ORDINARY HALF-YEARLY GENERAL MEETING of the Proprietors of the Company will be held at the Company's Offices, No. 5, Great Winchester Street, Old Broad Street, London, on Friday, March 6, 1903, at Two o'clock in the Afternoon precisely, to receive the Report of the Directors and the Accounts of the Company for the Half Year ended the 31st of December, 1902, to declare Dividends, to elect Directors, to appoint a Special Auditor, and for other purposes.

The TRANSFER BOOKS of the Company WILL BE CLOSED from the 21st of February to the 6th of March, both days inclusive.

By order,
ERNEST L. BURTON,
Secretary.

5, Great Winchester Street,
Old Broad Street, London, E.C.,
Feb. 15, 1903.

BROMLEY GAS CONSUMERS' COMPANY.

NOTICE is Hereby Given, that the ORDINARY HALF-YEARLY GENERAL MEETING of this Company will be held at the "Bell" Hotel, Bromley, Kent, on Thursday, the 26th day of February, 1903, at Six o'clock p.m. precisely: To receive the Report of the Directors, with the Balance-Sheet certified by the Auditors, to declare a Dividend, to determine the amount of the qualification for Directors and Auditors and their Remuneration, to elect Two Directors and an Auditor on retirements by rotation, and to transact generally the business of a General Meeting.

The TRANSFER BOOKS WILL BE CLOSED from the 11th of February to the 26th of February, both days inclusive.

By order of the Board,
HENRY W. AMOS,
Secretary.

Offices: 156, High Street,
Bromley, Kent, Feb. 11, 1903.

KENT WATER-WORKS.

NOTICE is Hereby Given, that a GENERAL MEETING of the Company of Proprietors of the Kent Water-Works will be held at the Terminus Hotel, Cannon Street, City of London, on Wednesday, the 25th day of February, 1903, at the hour of Twelve at noon, pursuant to the Act of Parliament—

To receive a Report from the Directors.

To declare a Dividend.

To elect Three Directors and One Auditor in the place of those retiring by rotation.

To transact generally the business of a General Meeting of the Company.

The Chair will be taken, and proceedings commence, at Twelve o'clock precisely.

The REGISTER OF TRANSFERS WILL BE CLOSED on the 12th day of February, and until the 25th day of February, both days inclusive.

By order of the Directors,
A. DICKSON, Jun.,
Chief Clerk and Secretary.

Mill Lane, Deptford,
Feb. 6, 1903.

CHELSEA WATER-WORKS COMPANY.

WHEREAS the Governor and Company of Chelsea Water-Works have been authorized by the Local Government Board, in an Order dated the 14th of January, 1903, to raise the sum of Twenty-two Thousand Five Hundred and Fifteen Pounds by the issue of DEBENTURE STOCK for the purposes of contribution and expenditure by the said Company in respect of the construction of works of intercommunication, and

WHEREAS the Company are empowered to raise this amount by the issue of Debenture Stock bearing Interest at the rate of Three per Cent. per Annum, such Debenture Stock being redeemable at par by the Company at any time after the expiration of 25 Years from the date of issue, on Six Months' previous notice to the registered holder,

NOTICE IS HEREBY GIVEN, that the Governor and Company of Chelsea Water-Works propose to offer such Debenture Stock for Sale by Public Tender.

Forms of Tender and Conditions of Sale may be obtained on application at the Offices of the Company, 41, Commercial Road, Pimlico, S.W.

The last day for the receipt of Tenders will be the 4th of March, 1903.

By order,
G. H. GILL,
Secretary.

BOROUGH OF PORTSMOUTH WATER-WORKS COMPANY.

WATER ORDER, 1902.

THE Directors of the above Company HEREBY GIVE NOTICE—That a SALE by AUCTION of TWO THOUSAND NEW ORDINARY £5 SHARES in the above Company will, under, and in pursuance of, the Borough of Portsmouth Water Order, 1902, take place at Messrs. Hall, Pain, and Goldsmith's Estate Sale Rooms, 57, Commercial Road, Portsmouth, on Thursday, the 2nd day of April, 1903, at Seven o'clock in the evening.

The above Shares, which form part of the New Ordinary Capital authorized to be raised by the said Order, will be sold in Lots, of which the amounts and particulars (together with the Conditions of Sale) will be duly announced.

Dated this 12th day of February, 1903.

By Order of the Board of Directors,
J. L. WILKINSON,
Secretary to the Company.

Company's Offices, Commercial Road,
Portsmouth.

ISSUES BY AUCTION OF GAS AND WATER STOCKS AND SHARES.

MR. ALFRED RICHARDS begs to notify that his ISSUES by AUCTION under PARLIAMENTARY POWERS of STOCKS and SHARES in LONDON, SUBURBAN, and PROVINCIAL GAS and WATER COMPANIES take place PERIODICALLY at the Mart, TOKENHOUSE YARD, E.C.

Terms for Issuing such Capital, and also for including Gas and Water Stocks and Shares belonging to Private Owners in these Periodical Sales, can be obtained on application at Mr. ALFRED RICHARDS' OFFICES, 18, FINSBURY CIRCUS, E.C.

By order of the Directors of the

WEST HAM GAS COMPANY.

NEW ISSUE OF £19,100 OF FOUR PER CENT. PERPETUAL DEBENTURE STOCK,

Offering to Trustees and others an investment of the soundest character.

MR. ALFRED RICHARDS will Sell the ABOVE BY AUCTION, at the Mart, E.C., on Wednesday, Feb. 18, at Two o'clock, in Lots.

Particulars of the SECRETARY OF THE COMPANY, at the Offices, Union Street, STRATFORD; and of the AUCTIONEER, 18, FINSBURY CIRCUS, E.C.

LOWESTOFT WATER AND GAS COMPANY.

SALE BY AUCTION OF 400 ADDITIONAL ORDINARY £10 SHARES,

Ranking for 7 per cent., the Dividend on similar Shares in the Company having been 5½ per cent. for several Years past; Also

£1000 FOUR PER CENT. PERPETUAL DEBENTURE STOCK.

MR. ALFRED RICHARDS will SELL the above by AUCTION, at the MART, LONDON, E.C., on TUESDAY, Feb. 24, at Two o'clock, in Lots, by order of the Directors.

The Company, Incorporated in 1853, supply Water and Gas in Lowestoft and the surrounding district. The Water-Rental in 1891 was £7146; in 1901, it exceeded £13,500; and the Gas Consumption has advanced from 43 million cubic feet in 1891 to upwards of 70 millions in 1901. New Works to keep pace with the increasing demand for Water and Gas are necessary; and it is for these Works that the new Capital is being raised.

Particulars of Sale, and Form of Instructions for the Auctioneer or Secretary to purchase for Investors unable to attend the Auction, obtainable, post free, of the SECRETARY OF THE COMPANY, 137, London Road, LOWESTOFT, and of the AUCTIONEER, 18, FINSBURY CIRCUS, E.C.

By Order of the Directors of the

SOUTH-WEST SUBURBAN WATER COMPANY.

NEW ISSUE OF £6250 FOUR PER CENT. IRREDEEMABLE DEBENTURE STOCK.

MR. ALFRED RICHARDS will Sell the ABOVE BY AUCTION, at the Mart, E.C., on Tuesday, Feb. 24, at Two o'clock, in Lots.

Particulars of the AUCTIONEER, 18, FINSBURY CIRCUS, E.C.

CROMER.

H. J. LIMMER has received Instructions from the Cromer Gas Company (who have erected new Works) to SELL, BY AUCTION, on their late premises in Mill Lane, Cromer, on Tuesday the 24th of February, 1903, at Three o'clock, the surplus GAS-WORKS PLANT and BUILDINGS, including a 35 feet diameter Gasholder complete, Purifier Traveller complete for 10-feet Purifier, Station Governor, several Valves (10 inch to 6 inch), and assortment of Pipes, Bends, Mouthpieces, and Retort-Lids, with many other useful lots; also, for breaking up, brick Cottage, Governor-House, Retort-House, Two large Concrete Tanks, together with several pairs of Doors, Scrap Iron, &c.

Catalogues in due course.

Auction Offices,
Cromer and Sheringham.

SUNDERLAND AND SOUTH SHIELDS WATER COMPANY.

IMPORTANT SALE OF WATER STOCK.

TO BE SOLD by Auction, in the Long Room of the Queen's Hotel, Fawcett Street, Sunderland, on Thursday, the 19th of February, 1903, at Two o'clock in the Afternoon prompt,

Mr. ATKINSON GIBSON, AUCTIONEER,

NEW STOCK (Maximum Dividend Five per Cent.), authorized to be created and issued under the powers contained in the Sunderland and South Shields Water Act, 1891, of an amount to raise

£24,400

The above Stock will be entitled to Dividend from the 1st day of January, 1903, and be registered in the name of the Purchaser free of charge.

A Deposit of 10 per cent. will be required at the time of Sale; the remainder to be paid on or before the 28th day of February, 1903.

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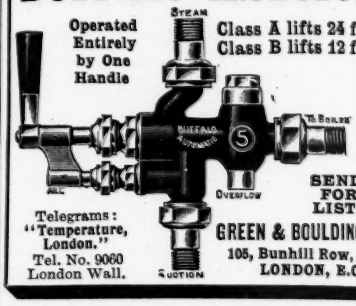

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RECOVERY OF SULPHUR,

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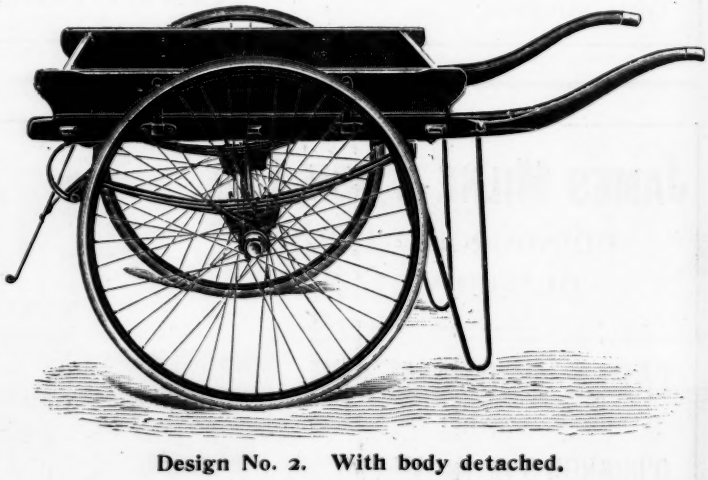

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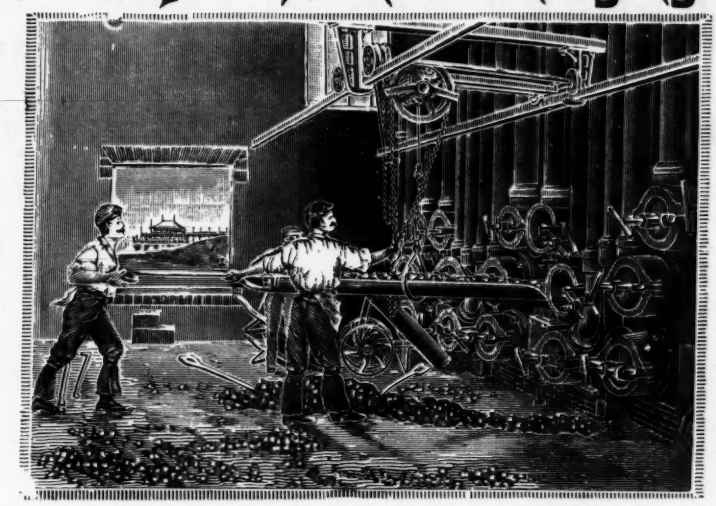

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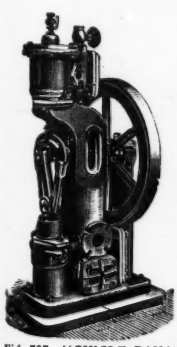

Fig. 705. "SINGLE RAM" STEAM-PUMP.

Fig. 598. "CORNISH" STEAM-PUMP FOR BOILER FEEDING, &c.

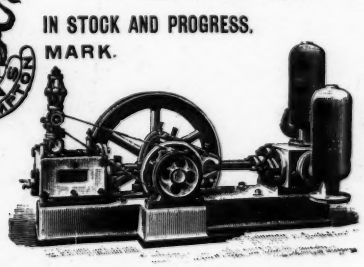

Fig. 685. "RELIABLE" STEAM-PUMP FOR TAR AND THICK FLUIDS.

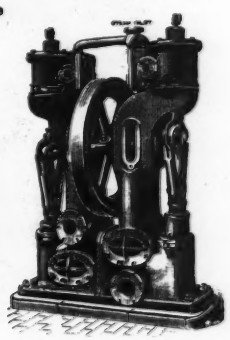

Fig. 712. "DOUBLE-RAM" STEAM-PUMP.

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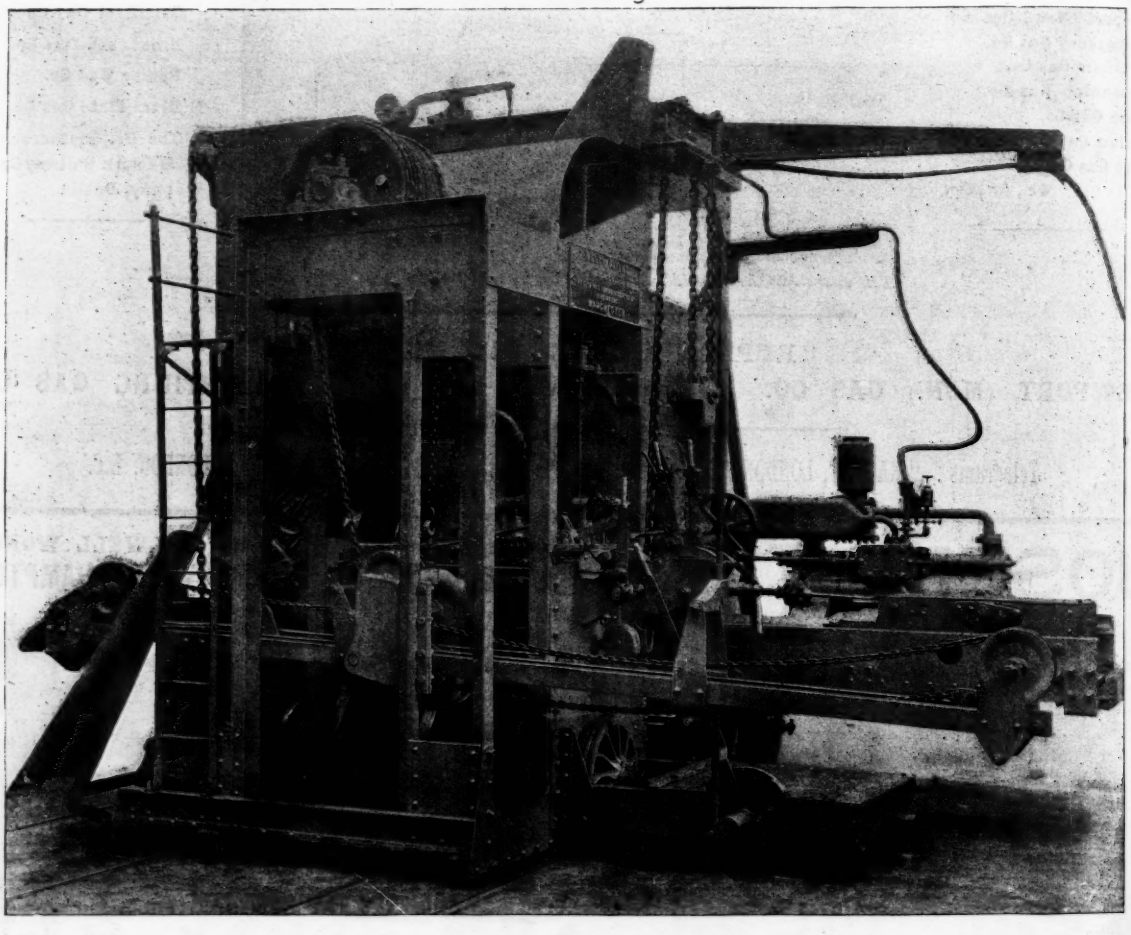

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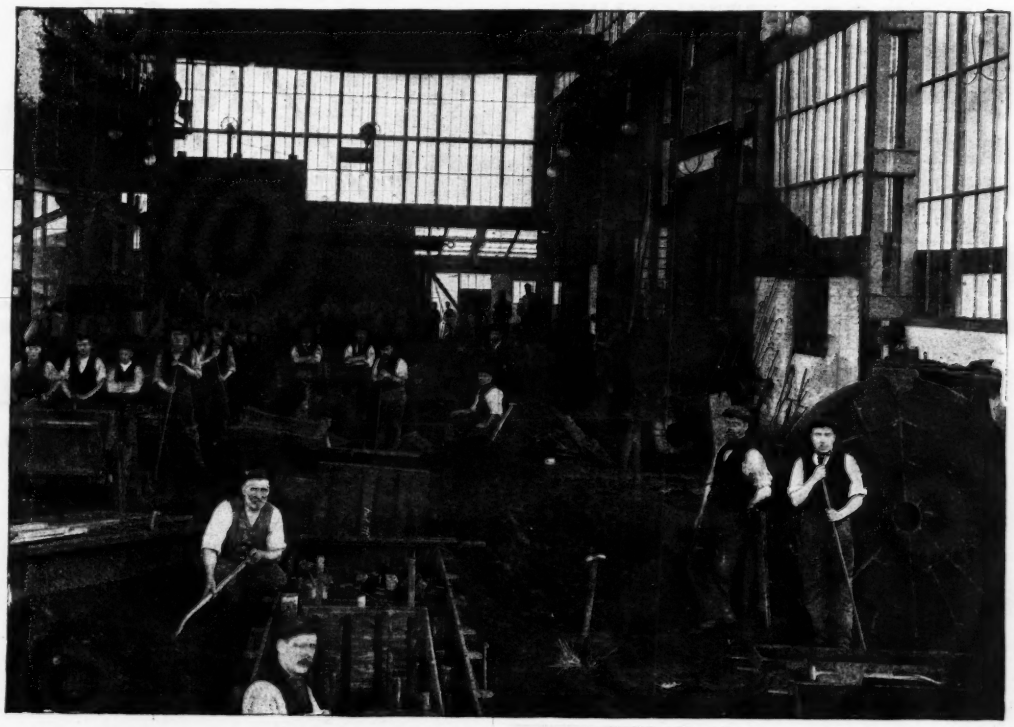

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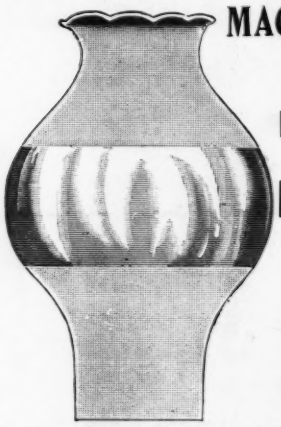

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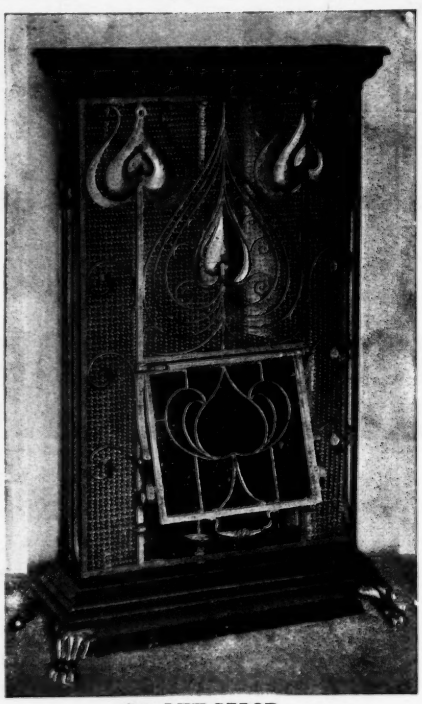

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